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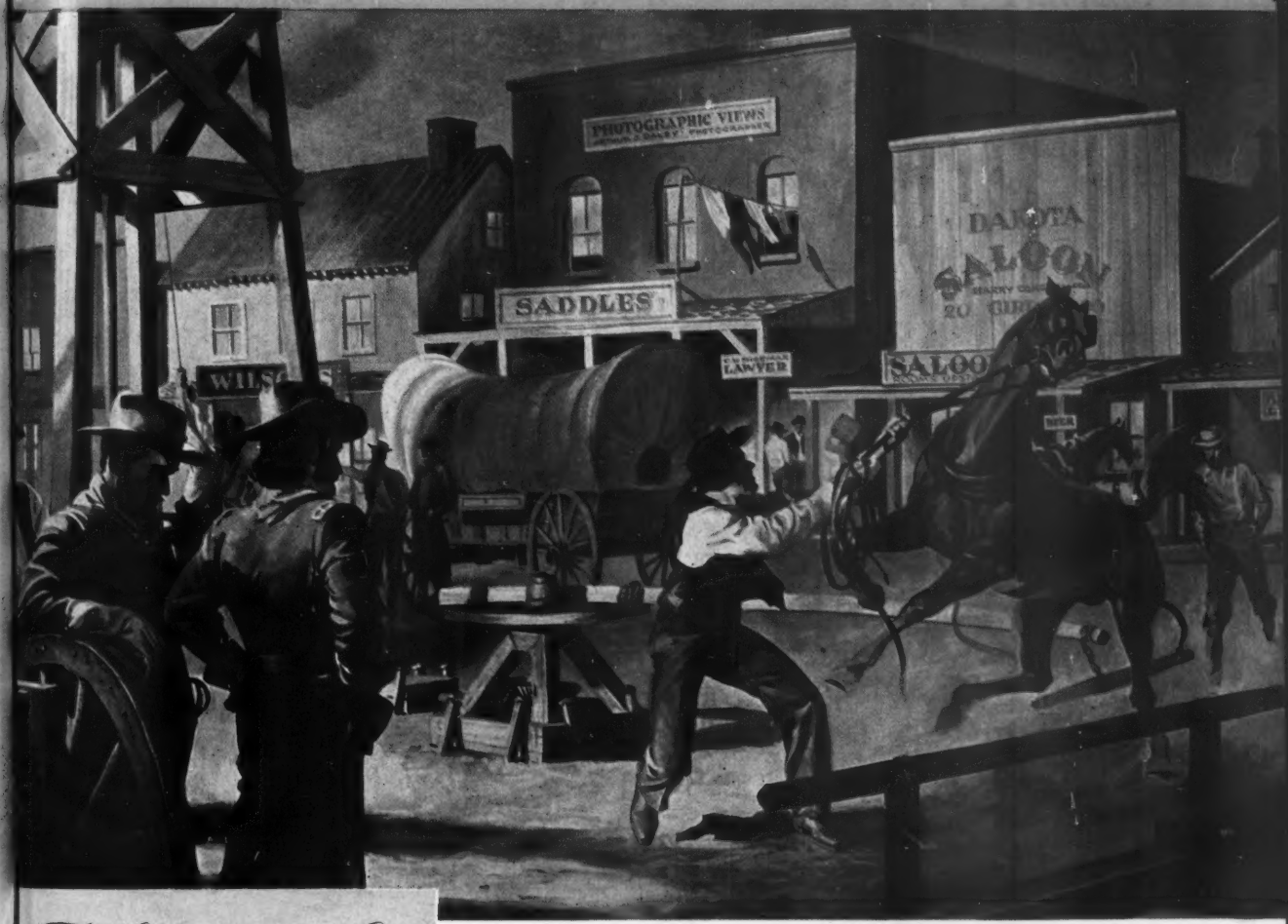
AUG 6 1948

The OIL AND GAS JOURNAL



The Cavalcade of Oil

NUMBER EIGHT OF A SERIES

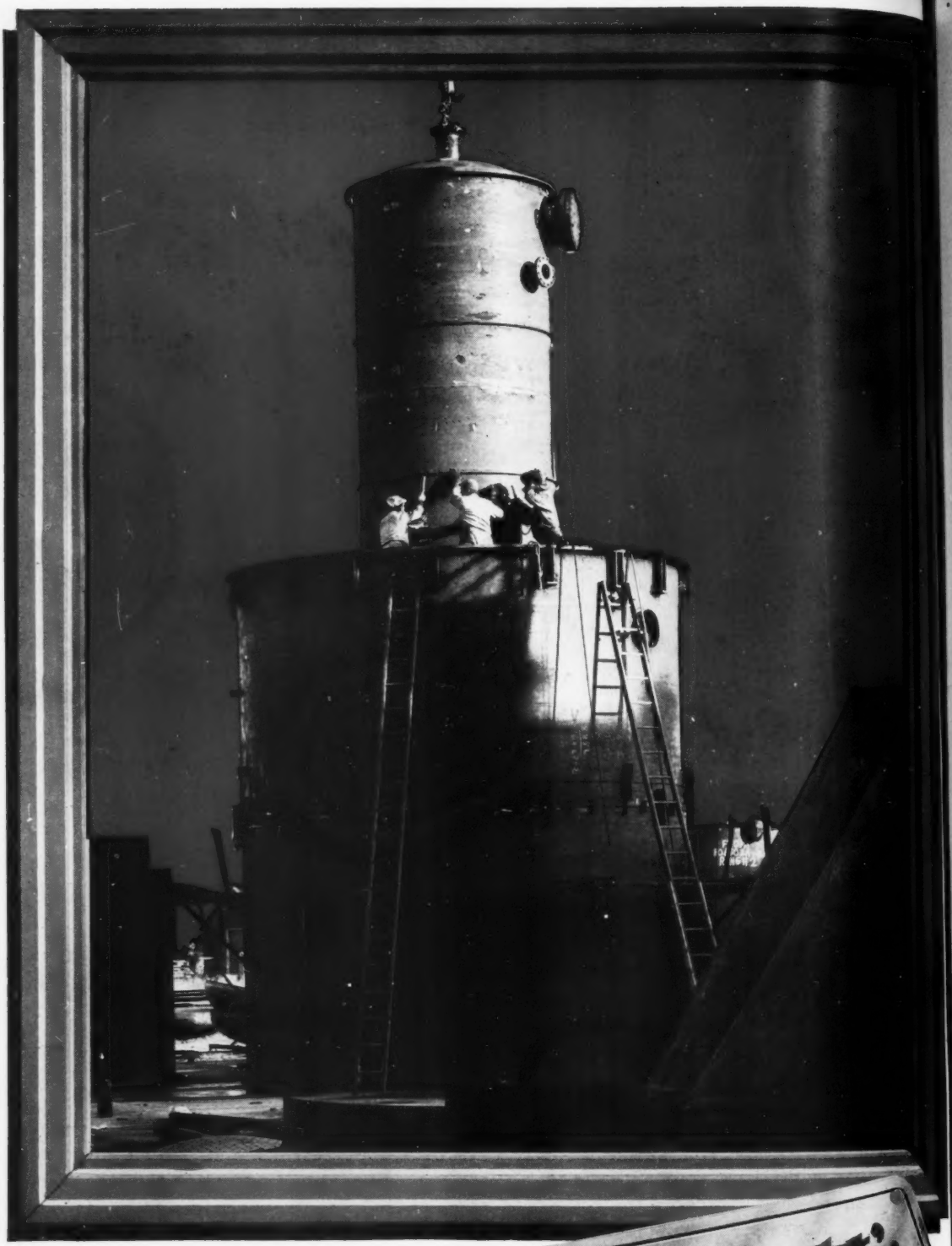
THE FIRST HYDRAULIC ROTARY RIG *was built by the Baker brothers in a blacksmith shop in the Dakota Territory and was originally powered by a horse walking around a sweep. It was first used to drill water wells and was later applied to oil drilling in the Corsicana field in Texas.*

HUGHES
TOOL COMPANY
HOUSTON, TEXAS
WORLD STANDARD OF THE INDUSTRY

Among the significant events of major importance in the history of oil drilling was the introduction of the rotary drilling process, a major development over previous "boring" methods. Powered by a horse driven sweep, this tedious method made slow progress by turning a crude bit with projecting wings through formations below the surface of the earth. However slow and troublesome this early mechanism, its engineering theory was proved in actual drilling practice. It was this basic fact that inspired the invention of the Hughes Rock Bit in 1909 which, in turn, revolutionized the oil drilling industry.

The development of this drilling theory has motivated the Hughes engineering and research divisions to improve continuously on the original Rock Bit. Since the invention of the Hughes Bit, myriad varying formations in oil fields of the world have been encountered, many of which necessitated a different drilling treatment. Hughes scientists and research specialists have met these challenges with an "Engineered Solution" for drilling every sedimentary formation known to man. Thus, Hughes products have earned the enviable reputation, "WORLD STANDARD OF THE OIL DRILLING INDUSTRY."

PRICE 20 CENTS TABLE OF CONTENTS PAGE 33 **AUGUST 5, 1948**

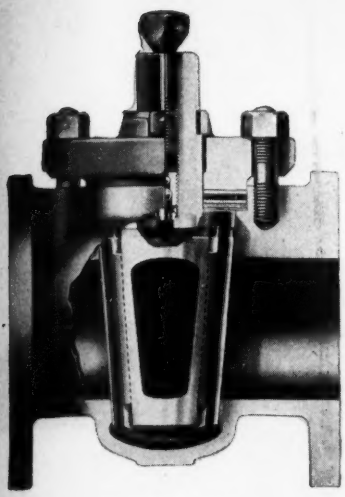


Bottom section of an 18-foot vacuum tower being fitted and match-marked for field erection at one of Wyatt's two modern steel plate fabricating plants.

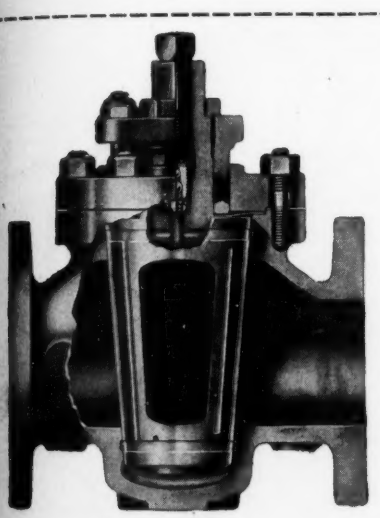
Wyatt's
HOUSTON - DALLAS

WYATT METAL & BOILER WORKS

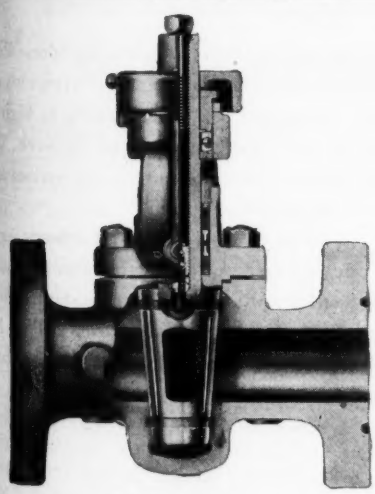
STEEL PLATE DESIGNERS, FABRICATORS AND ERECTORS TO INDUSTRY'S SPECIFICATIONS



Single Gland Type



Regular Gland Type



Ball Bearing Type

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Acids... Solvents... Sludges...

and other troublesome liquids—

USE WALWORTH LUBRICATED PLUG VALVES

When handling acids, condensates, dyes, oils, solvents, solutions, slurries and hundreds of similar "troublesome" liquids, you get better control, more dependable service and lower operating costs with Walworth Lubricated Plug Valves.

These valves have proved their ability to give easy operation . . . fast action . . . tight shut off . . . greater protection against corrosion. Turning is smooth and easy; just a ¼ turn from full-opening to full-closing. Moreover, Walworth Lubricated Plug Valves are tightly sealed against leaks — *whether open or shut.*

Walworth Lubricated Plug Valves are available in sizes ½" to 24" for pressures from 125 to 5,000 psi, and for vacuum requirement. For further information about Walworth's Complete Line of Lubricated Plug Valves, see your Walworth distributor or write for Catalog No. 46L.

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only 2 parts move

in this low-cost liquids-mover!

Yes, there are only two moving parts in Fairbanks-Morse Rotary Pumps. These exceptionally compact liquids-movers, with their simplicity of design, bring you low-cost pumping at high efficiency. A precision-cut rotor and pinion do all the work. There are no complicated parts to cause trouble . . . no worries about suction leaks . . . no vapor locks.

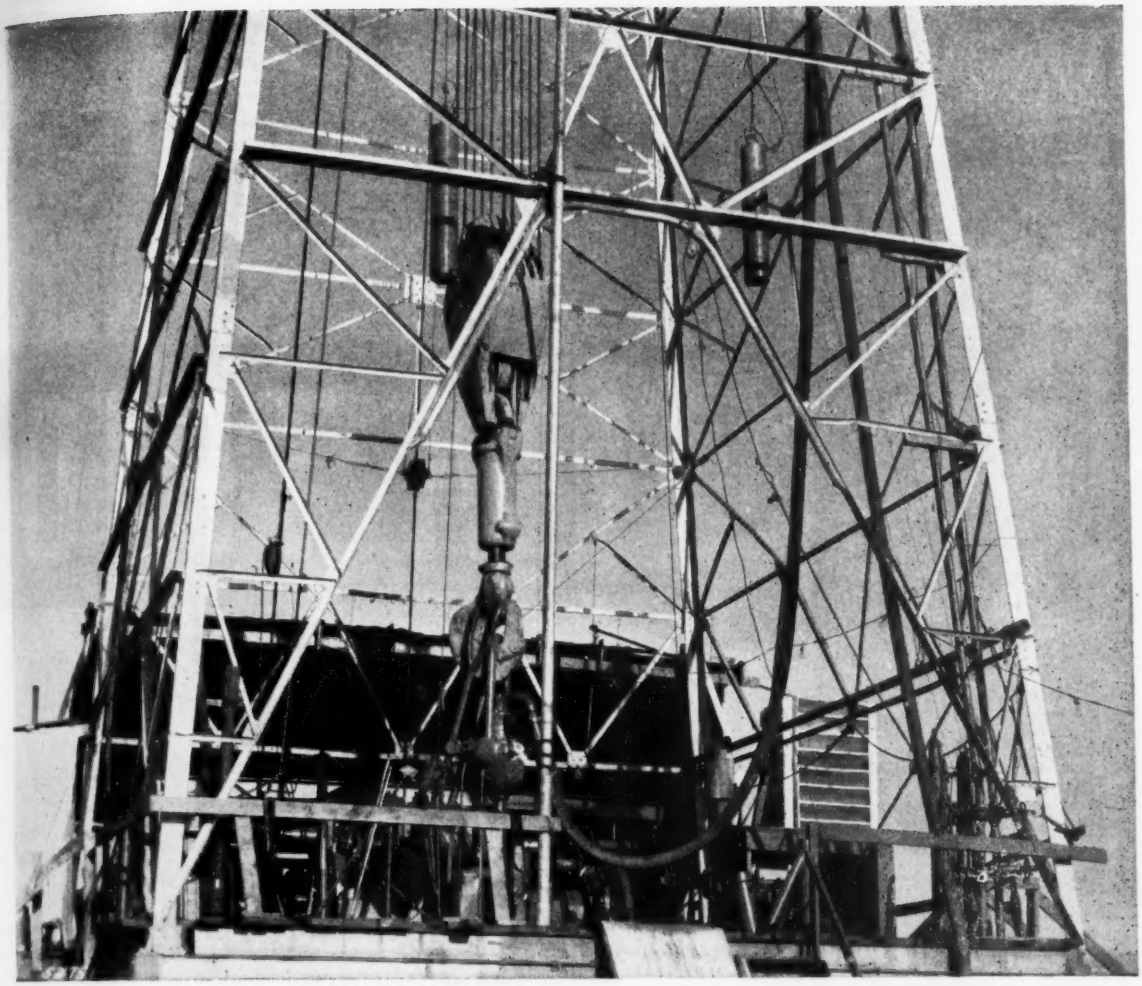
Gathering lines . . . booster duty . . . general refinery service, wherever you use one of these positive acting pumps, you can be sure of definite rated output. There is a constant pumping action . . . no vibration or shocks to affect pump life. Most sizes and modifications are available from stock. Fairbanks, Morse & Co., Chicago 5, Illinois.

when it comes to pumps . . .

FAIRBANKS-MORSE

A name worth remembering

OIL FIELD EQUIPMENT • DIESEL LOCOMOTIVES • DIESEL ENGINES • PUMPS • SCALES • MOTORS • GENERATORS STOKERS • MAGNETOS • RAILROAD MOTOR CARS and STANDPIPES • FARM EQUIPMENT



B. F. Goodrich rotary drilling hose has strength to spare inside and out, with lightness and flexibility, too!

B.F. GOODRICH rotary drilling hose keeps your rig running without shutdowns, spares your hose "blow-outs" that can damage well or drilling bit, and mess up your rig. To do that, BFG makes a hose that's stronger all around, tougher inside and out. Here's how they do it.

Stronger wall — Higher burst strength with minimum weight, maximum flexibility, results from heavy duck plies reinforced with patented helically wound mesh tape. Multiple plies of metallic mesh tape do the work that only many extra fabric plies could otherwise do — but without the added weight and stiffness. This strength-to-spare means no hose "blow-outs" — added safety for your crew and rig. Tube is compounded of oilproof rubber — using oil in the "mud" won't affect it.

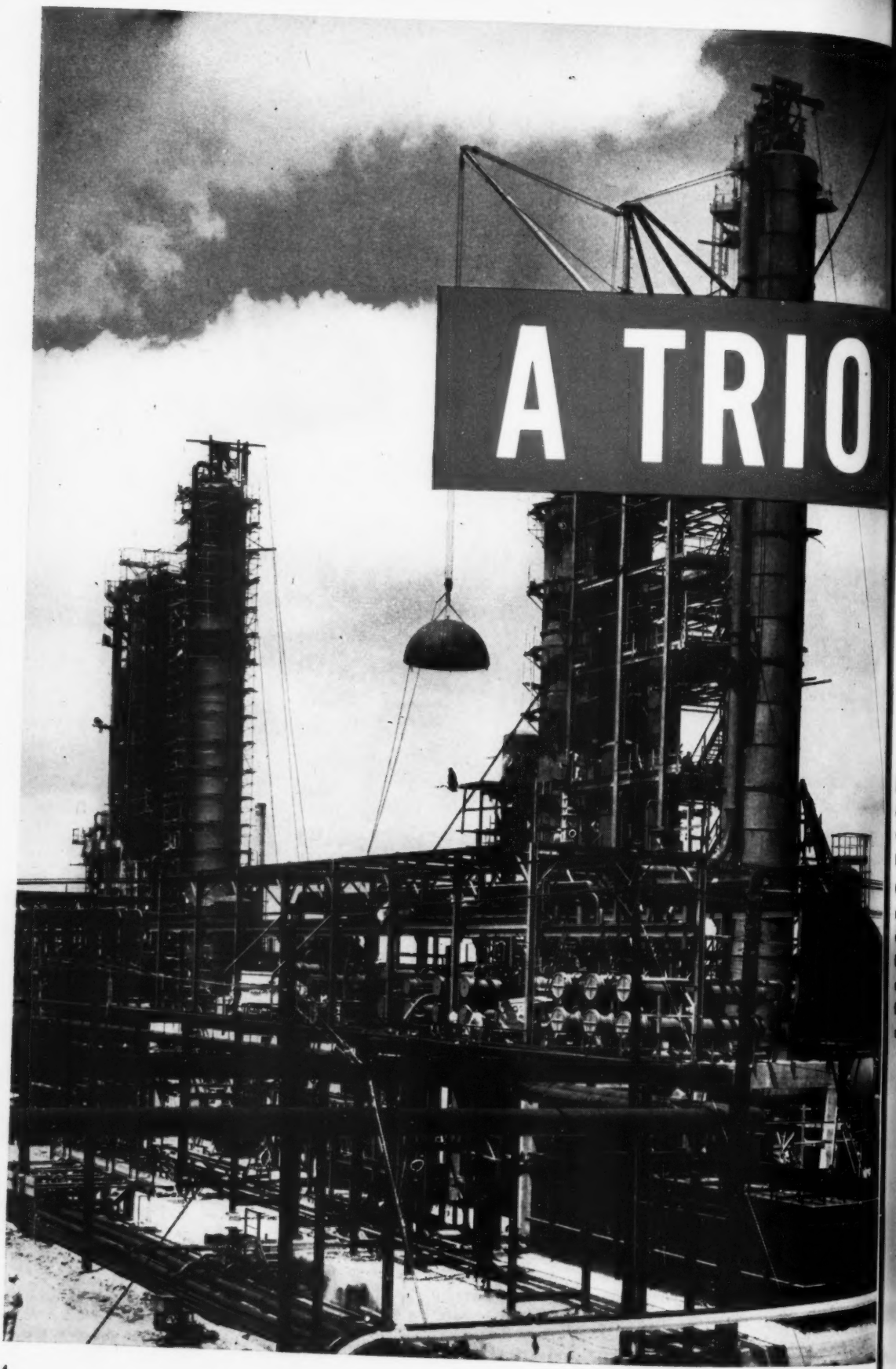
Tougher, abrasion-resistant cover — Because it's made of the highest-grade abrasion resisting rubber, you can get tough with this hose cover. No need to baby it — let it stand out in the sun, rain, wind and weather — you find it still protecting the inner construction.

More flexible, easier to handle — For all its toughness this hose has the easy-handling "feel" that's so important in moving and handling hose on the job or moving on to the next job. The helically wound tape reinforcement keeps it light and supple. It's easy to attach to the rig, to move from one well to another, to coil without stubbornness, kink or "snaking." Hangs well from the stand-pipe.

Stronger, more flexible, longer lasting — Here's a hose that can drill under high rock and gas pressures, that your crew can treat rough, that will keep your rig on the job with a minimum of hose trouble. See this better rotary drilling hose, and other hose for oil rigs at your local B.F. Goodrich distributor, or write: *The B.F. Goodrich Company, Industrial Products Division, Akron, Ohio.*

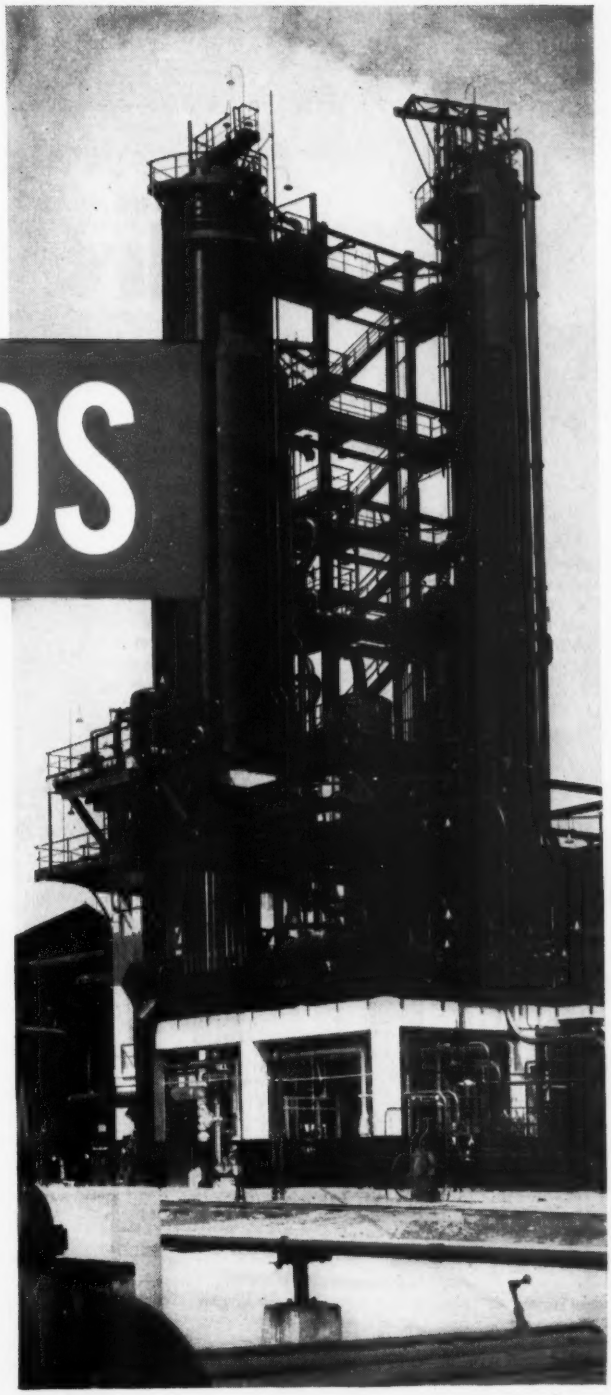
B.F. Goodrich

FIRST IN RUBBER


A TRIO

EXTENDS

the line of notable Badger distillation units



Latest additions are these three combination atmospheric-vacuum distillation units for Gulf Oil Corporation: each designed to process 20,000 barrels per stream day of crude.

Conventional equipment?—Perhaps. But Badger's meticulous attention to design details resulted in units easy to operate and with extreme flexibility for varying crude supplies. Efficient construction management resulted in the completion of these facilities in quick sequence during a period of material and labor shortages.

E. B. BADGER & SONS CO. Established 1841

BOSTON 14 • NEW YORK • SAN FRANCISCO • LOS ANGELES • LONDON

Process Engineers and Constructors for the Petroleum, Chemical and Petro-Chemical Industries

A SUBSIDIARY OF STONE & WEBSTER, INC.

M.O.JOHNSTON

Presents

THE MASON

hydra-line

(PATENT NO. 2240794)

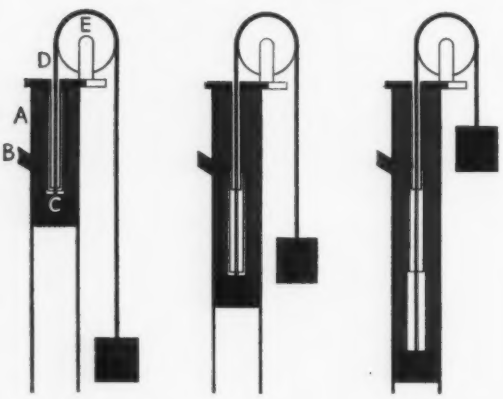
The most talked of equipment at the oil show!

Combines hydraulics with the wire line for hoisting operations in drilling rigs, pulling rigs and pumping units

THE RIG WITHOUT DRAWWORKS OR TRAVELING BLOCK

THE MASON HYDRA-LINE RIG departs from conventional means of hoisting operations by combining the simplicity and smoothness of hydraulic power with the utility and flexibility of wire rope to completely eliminate drawworks and traveling block assemblies. With the HYDRA-LINE, raising and lowering are accomplished by simple manipulation of a single micro-sensitive control. This revolutionary new principle provides unlimited number of hoisting speeds, greater "hook" horsepower per input horsepower, virtually unlimited derrick height and drilling depth, fluid cushioning to minimize load shocks, sealed-in oil bathed protection for all working parts and a rig and crew safety factor not found in any conventional type rig!

The Hydra-Line principle is simple



1 Load at rest with telescoping tube and piston assembly (C) in fully retracted position.

2 Fluid entering port (B) forces piston down to raise load. Note telescoping tubes.

3 Tubes extended and load at maximum height. Weight of load lifts piston when variable orifice is opened to bleed.

THE MASON HYDRA-LINE consists of only five principal parts: a smooth-bore steel cylinder (A), sealed top and bottom and with one common input-output port (B); a piston and telescoping tube assembly (C); a wire line (D) passing through the telescoping tubes and secured to the piston and a large diameter crown sheave (E), positioned to carry the wire line from the piston to load being raised or lowered.

Fluid introduced into the cylinder above the piston forces the piston downward to lift load suspended from wire line—fluid bled from the cylinder plus air compressed by piston during downtravel, forces the piston upward to lower the load.

Total load capacity is dependent upon number of cylinders used. A Hydra-Line Rig employing two cylinders easily raises a 150,000 lb. hook load with less than 700 PSI on the piston!

ADVANTAGES OF THE HYDRA-LINE PRINCIPLE

LARGE PISTON AREA *permits low unit pressure for all hoisting operations.*

NUMBER OF TELESCOPING TUBES *limited only by ratio with piston area—cross-sectional area is less than 10% of the total piston area.*

VIRTUALLY NO LIMIT TO STROKE LENGTH—*column loading on telescoping tubes is negligible—a 200' stroke is as feasible as a 10' stroke.*

MAIN CYLINDERS ARE STRUCTURAL PART OF MAST OR DERRICK—*provide sufficient strength to carry rig-rated load.*

LOADS "FLOATED" DOWNWARD AT ANY SPEED—*a variable orifice controls bleeding of fluid from cylinders.*

HOOK CAN BE DROPPED RAPIDLY WITH LIGHT LOADS—*air compressed in cylinder by piston downtravel "boosts" piston up to lower light loads.*

THE HYDRA-LINE IS IDEAL FOR-

HEAVY DUTY DEEP WELL DRILLING RIGS
with capacities to 500 tons—Derrick heights to 210' 0"—Drilling depths to 20,000' or deeper—No substructure required except for derrick.

FULLY PORTABLE & SEMI-PORTABLE DRILLING & WORKOVER RIGS
with capacities to 125 tons—Derrick heights to 112' 0"—Drilling depths to 10,000' per single unit. By placing two units face to face load and depth capacities double.

LIGHT PORTABLE PULLING & SHALLOW DRILLING UNITS
with capacities from 5 tons to 50 tons—Mast heights from 20'0" to 60'0"—Truck mounted.

COMBINATION PUMPING & PULLING UNITS
with variable pump strokes up to 60'—Central power or individually operated—Pumping and pulling of rods and tubing accomplished with the same unit.

FOR FURTHER INFORMATION CONTACT

THE hydra-line DIVISION

OF THE JOHNSTON ENTERPRISES

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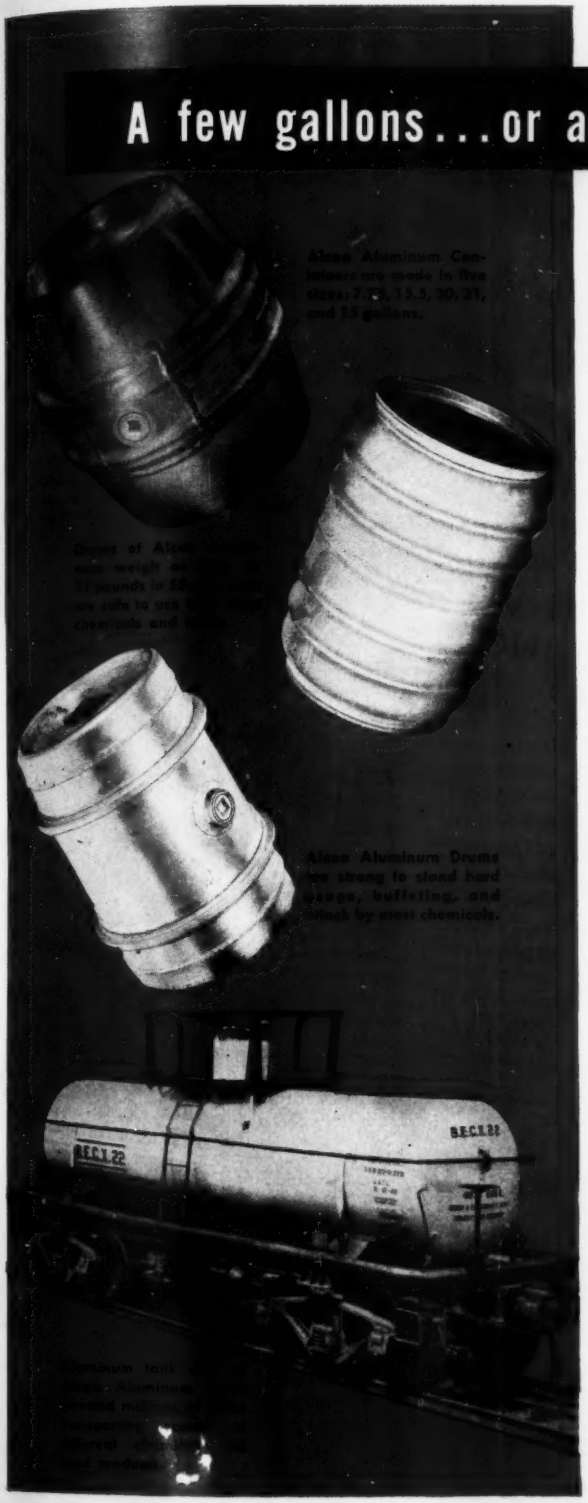
A few gallons...or a few thousand gallons..



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purer.. safer.. cheaper..

in

ALCOA ALUMINUM

Protect color, purity, and strength of your chemicals and solvents in transit . . . ship in Alcoa Aluminum Drums and Barrels, and tank cars built of Alcoa Aluminum.

No discoloration . . . aluminum cannot cause rust-colored compounds with chemicals. Liquids that must stay water-white travel safely in aluminum containers.

No toxic compounds . . . aluminum is inert to most chemicals and food products, will not cause undesirable side reactions.

Cheaper to ship . . . you make worthwhile freight-rate savings because of the lighter weight of aluminum barrels and drums. Less than ½ as heavy as comparable steel or wood containers.

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Write today for prices and information on Alcoa Aluminum Drums and Barrels, and for engineering data on aluminum railroad tank cars. ALUMINUM COMPANY OF AMERICA, 1928 Gulf Bldg., Pittsburgh 19, Penna. Sales offices in 54 leading cities.

ALCOA FIRST IN ALUMINUM

ALCOA ALUMINUM 1888 1948 60 YEARS OF SERVICE

Here's News!

FOR SHOT HOLE DRILLERS

Baroid Products Give:

1. GREATER MUD YIELD
2. MINIMUM CARRYING WEIGHT
3. TROUBLE-FREE DRILLING

Geophysical Operators Choose Aquagel, Baroco, Impermex and Zeogel because they make more and better mud than ordinary clays.

AQUAGEL—This gel-forming colloidal drilling clay will yield as high as 100 barrels of excellent mud per ton of Aquagel. This mud will render care-free drilling through many types of formations troublesome to ordinary muds. Aquagel checks caving and loss of fluid from the hole, lubricates the bit and all moving parts, and suspends cuttings in the hole during interruptions in drilling.

BAROCO — An economical salt-water-resistant drilling mud provides good yield and excellent drilling qualities in either fresh or brackish water.

IMPERMEX—An organic colloid, specially developed to meet adverse drilling conditions, using either fresh or salt water.

ZEOGEL—A special drilling clay for drilling through salt or formations containing a high percentage of salt. Provides high yield and excellent suspending qualities regardless of salt percentages present.

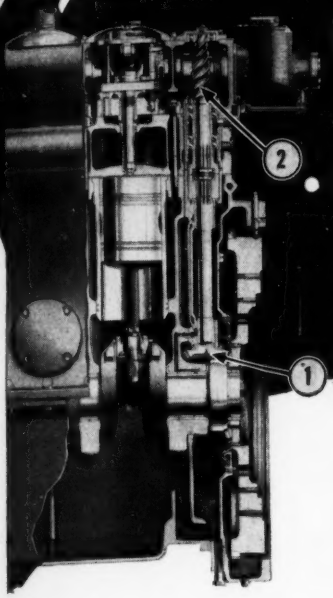
PATENT LICENSES, unrestricted as to sources of supply of materials, but on royalty bases, will be granted to responsible oil companies and others desiring to practice the subject matter of any and/or all of United States Patents Numbers, 2,041,086; 2,044,758; 2,064,936; 2,094,316; 2,119,829; 2,294,877; 2,387,694; 2,393,165; 2,393,173; 2,417,307 and further improvements thereof. Applications for licenses should be made to Los Angeles office.

BAROID SALES DIVISION
NATIONAL LEAD COMPANY
LOS ANGELES 12 • TULSA 3 • HOUSTON 2

Flywheel-end cam drive in

MURPHY DIESELS

...means greater accuracy of timing control and longer gear life



Section of the flywheel end of a Murphy Diesel. Drive for the cams is taken off the crankshaft at its point of smoothest rotation by means of a forged, case-hardened alloy steel bevel gear (1), the rotation is transmitted to the camshafts through a ball bearing mounted worm drive (2).

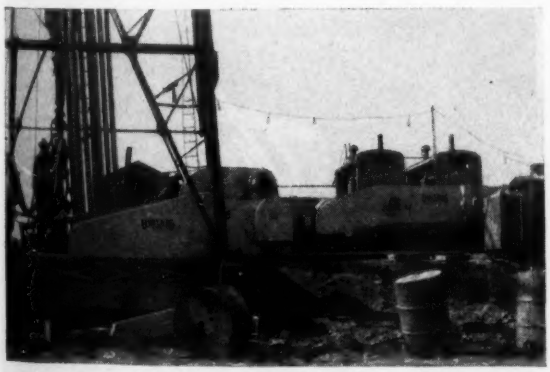
IN any engine the steadiest rotation of the crankshaft exists at the flywheel. By driving the camshafts from the flywheel end in Murphy Diesels, this uniform rotation is utilized rather than the uneven wear-producing rotation of the opposite end. The steady rotation of the flywheel end makes possible greater timing accuracy and longer drive life whereas the unsteady rotation of the other end imposes heavy loads on gear teeth and bearings causing rapid depreciation and wear and early, expensive replacement.

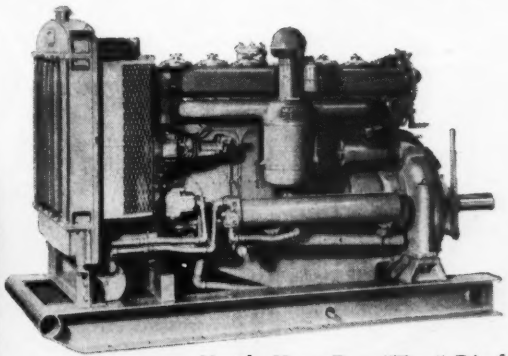
Flywheel-end cam drive is just one of several outstanding design features of Murphy Diesels. Others include "true" diesel operation, unit fuel injection, four valves per cylinder, dual overhead camshafts and hydraulic servo-type governor. Full details are given in the booklet *"7 Questions to Ask a Diesel Engine Salesman"*. Ask your Murphy Diesel Dealer for a copy or write to:

MURPHY DIESEL COMPANY

5305 West Burnham Street • Milwaukee 14, Wisconsin

Two Murphy Diesels, Model ME-66, rated at 150 H.P. continuous, 180 H.P. intermittent, power this drilling rig.





Murphy Heavy-Duty "True" Diesel Engines and Power Units, 90 to 215 H.P.; Generator Sets 60 to 115 K.W., A.C. or D.C.

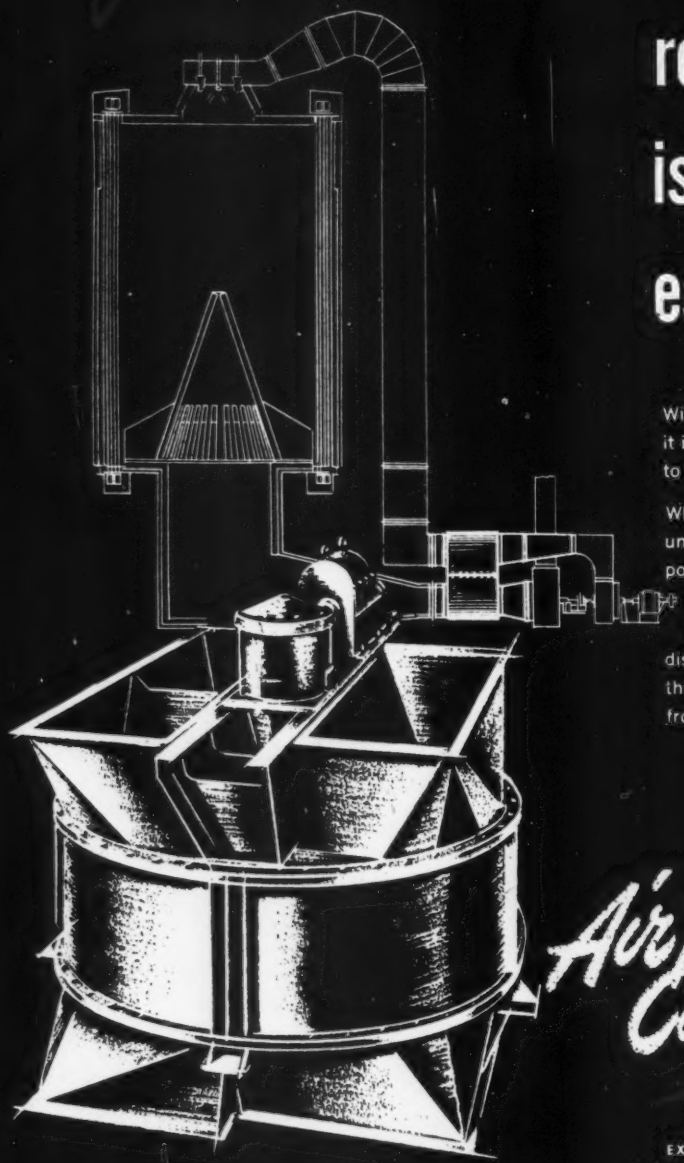
MURPHY DIESEL

LOWEST ULTIMATE POWER COST

Tulsa Branch, 416 S. Detroit Ave.

Designed for Preheat

when high heat recovery is essential



With the Ljungstrom Air Preheater, it is practical to push heat recovery to the limit.

While plans for cracking stills are under consideration, investigate the possibilities of the Ljungstrom. The specialized experience of Air Preheater engineers is at your disposal, to aid you in effecting the most economic heat recovery from flue gases.

The Air Preheater Corporation

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HOWCO REPORTS TO ITS CUSTOMERS—NO. 8 OF A SERIES

In 1925 the cost of the equipment used by Halliburton to perform a cementing job was $6,000 and the average revenue per job $245.

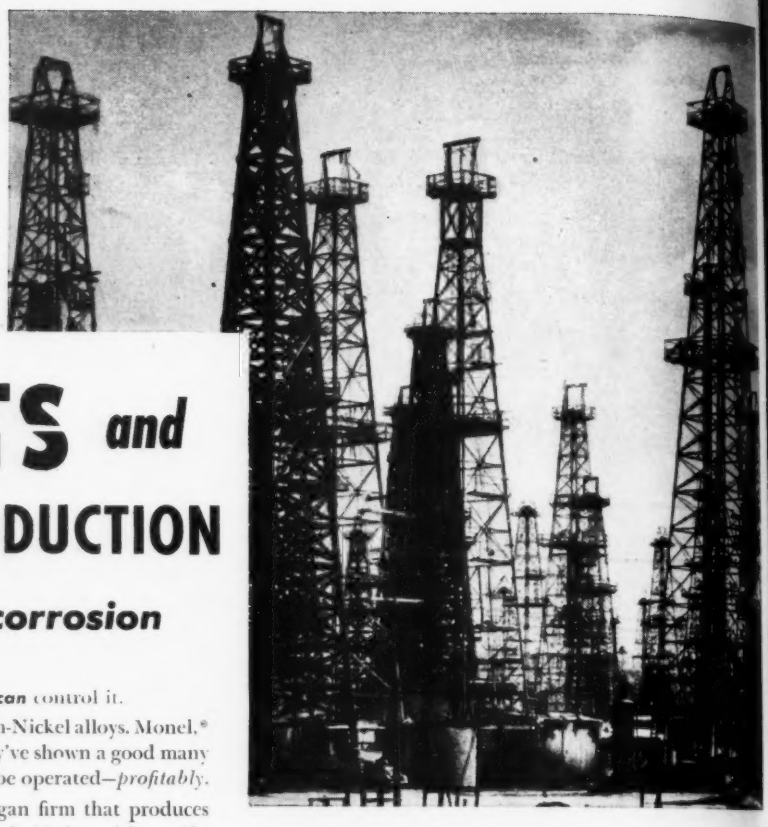
In 1947 the cost of the equipment had risen to $18,000 while the cost per job had dropped to $202.

No one offered more for the money in 1925. Yet in 1947, despite drastically increased labor and material costs, Halliburton was giving *more* in service for *less* money than was possible in 1925.

The explanation may be found in Halliburton's policy of investing a substantial portion of income in a ceaseless and energetic program of research. Out of this program have come the consistent technical progress and the important operational economies which have enabled Halliburton to offer more and more in value.

Erle P. Halliburton

Chairman of the Company
HALLIBURTON OIL WELL CEMENTING CO.
Duncan, Oklahoma



How YOU can

CUT COSTS and INCREASE PRODUCTION

...by controlling corrosion

You can't stop corrosion. But you ***can*** control it.

Install equipment made with high-Nickel alloys. Monel,* for example. Or "K"* Monel. They've shown a good many producers that corrosive wells can be operated—*profitably*.

Take the experience of a Michigan firm that produces from the Sylvania formation a chemical brine with specific gravity of 1.28. At a depth of 2,400 feet, the pump they were using just didn't stand up. *But trouble ended when they installed a Reda pump equipped with a "K" Monel shaft and Ni-Resist diffusers.*

Then consider the story of this well in Louisiana. It had *plenty* of oil below the surface—but would only make gas on a ⅛" surface choke with 3,000 pounds pressure. Freezing of surface flow lines and connections was frequent. The allowable couldn't be produced.

After the operator installed an Otis Removable Bottom Hole Regulator made of "K" Monel, surface pressure dropped to 1,350 psi. Freezing stopped. Gas-oil ratio was cut to a point where almost no oil was wasted. The regulator stayed in the tube 57 months, produced 869,839 barrels before it was pulled for inspection. *It was found in first-class condition.*

Of course, corrosion resistance is only one quality that contributes to the dependability of equipment like this. Extra strength, hardness, toughness or resistance to wear and abrasion may also be vital. *In high-Nickel alloys, you get the combination of properties you need.* Through years of use in the toughest areas of the mid-continent district, Monel and "K" Monel have proved especially well adapted to combat harsh conditions.

Monel, in addition to being rustproof and highly resistant to sour crudes, withstands the cutting action of high-pressure gas, provides unusually good resistance to erosion and abrasion by entrained solids. **"K" Monel** brings you those same characteristics *plus* extra strength and hardness. It is non-magnetic; by heat treatment its tensile strength can be developed to 140-170,000 psi, its hardness to 265-320 Brinell.

Both Monel and "K" Monel are used for parts subject to alternating stresses in the presence of corrosives. Their retention of good fatigue strength is particularly evident in extended equipment life.

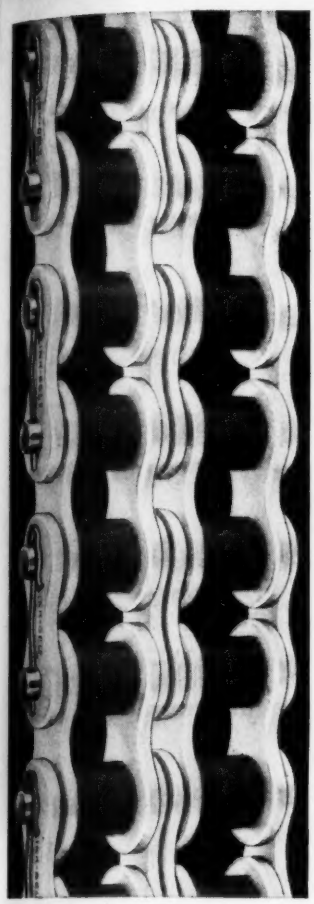
The full story of how you can put these and other Inco Nickel Alloys to work for you is contained in our new, illustrated booklet, *Controlling Corrosion in Petroleum Production Equipment*. It brings you typical performance and service stories of Nickel Alloys in a variety of corrosive uses. It discusses the important factors in reducing maintenance and replacement costs. There are sections dealing with exploration and drilling, pumping, and gas control.

The booklet tells, too, how you can get free technical advice on the selection of materials for severe service, and contains a listing of valuable Technical Bulletins that are available to you on request. Write for your copy—*now*. We'll get it into the next outgoing mail. *Reg. U. S. Pat. Off.

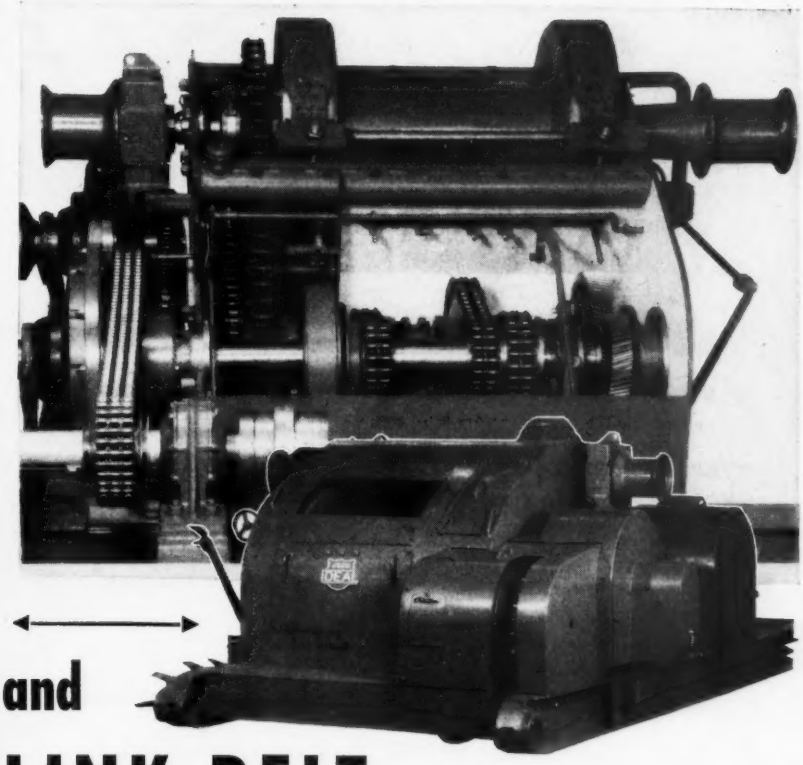
THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street, New York 5, N. Y.

EMBLEM OF SERVICE
INCO
TRADE MARK

MONEL..."K" MONEL...
Your partners in PROGRESS



This rig manufacturer says:
"Constructed for fast, economical drilling"



and

LINK-BELT

Silverlink ROLLER CHAIN is standard equipment

Yes, National has provided all the necessary design and features . . . including Link-Belt Silverlink Roller Chain throughout . . . in this Ideal Type 50 Consolidated Rig to insure dependable, fast, economical drilling under all conditions.

You'll find Link-Belt Silverlink 1¾" pitch double roller chain on the transmission drives—Link-Belt Silverlink 2½" pitch single roller chain for drum, catshaft and rotary drives—Link-Belt Silverlink 1¼" pitch triple roller chain for the engine to drawworks drive.

Since trouble-free rig performance in the field hinges largely on dependable power transmission, National has standardized on Link-Belt Silverlink Roller Chain for the Type 50 rig. You'll find dependable Link-Belt chain on all other types of National rigs, too.

In fact, throughout the oil industry, Link-Belt Silverlink Roller Chain is more than ever the choice of the oil country . . . with manufacturer and operator alike . . . because Silverlink continues to set the pace in all kinds of service for dependability, long life and trouble-free service.

> E-Z-ASSEMBLY <

Link-Belt Engineers have developed a construction that makes assembly and disassembly of multiple width chains in the field much easier. The press fits between chain pins and center sidebars have been eliminated, but load distribution across the width of the chain has been maintained.

LINK-BELT COMPANY

Indianapolis 6, Dallas 1, Houston 2, Los Angeles 33, Kansas City 6, Mo., New York 7, Toronto 8.

11,004

YOU GET *ALL THESE FEATURES* IN CHAPMAN STEEL VALVES

1 Valves with a high precision rating — a rating which *equals* or exceeds standard specifications.

2 Metals used in Chapman Steel Valves are produced under strict metallurgical control in Chapman's own foundries.

3 Made for pressures up to 1500 pounds per square inch.

4 Made for temperatures to 1000° F., or even higher, and for temperatures as low as — 160° F.

Chapman Steel Valves include gate, globe, angle, and check valves, and are backed by long years of successful performance in even the severest services. Write *today* for complete information.

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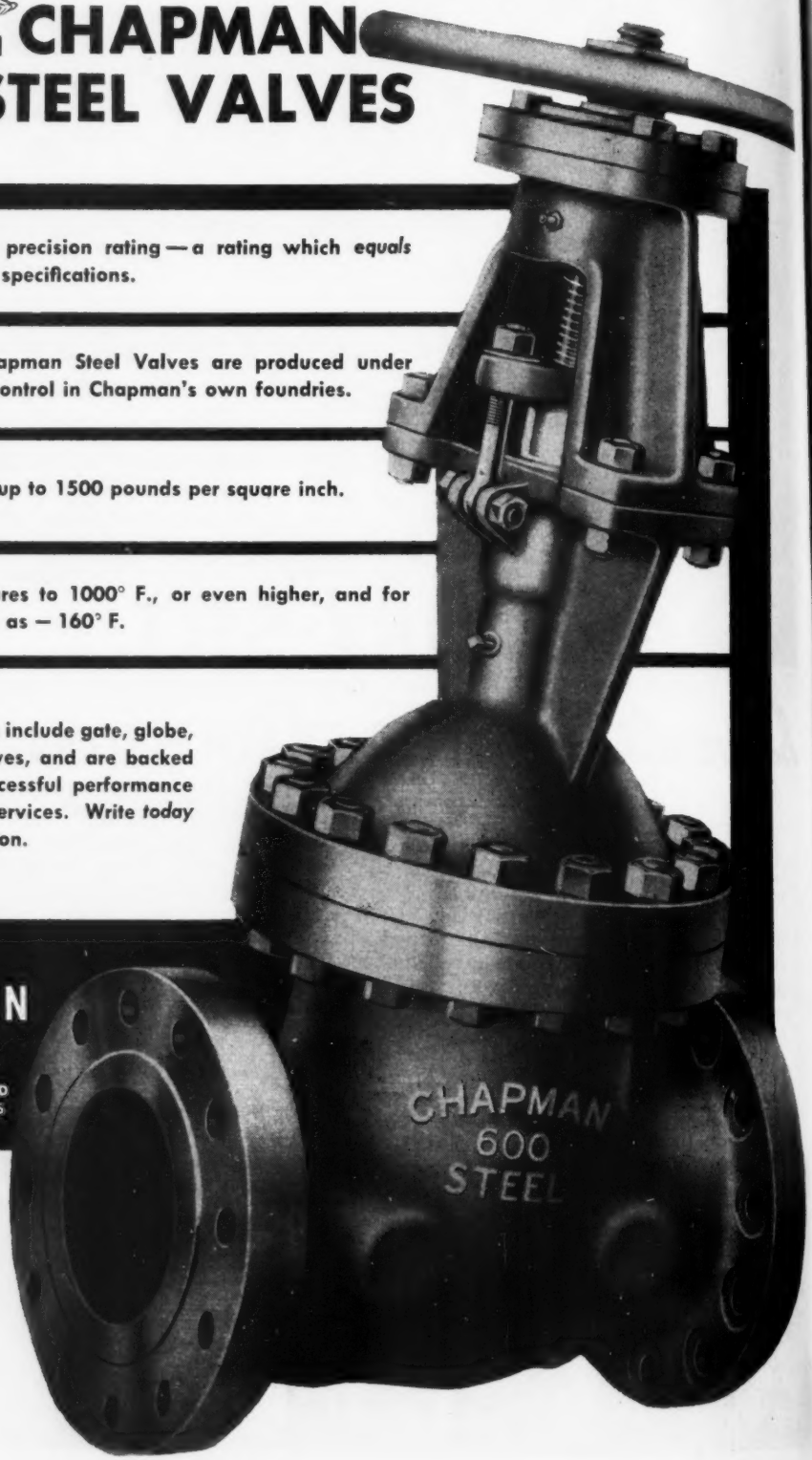
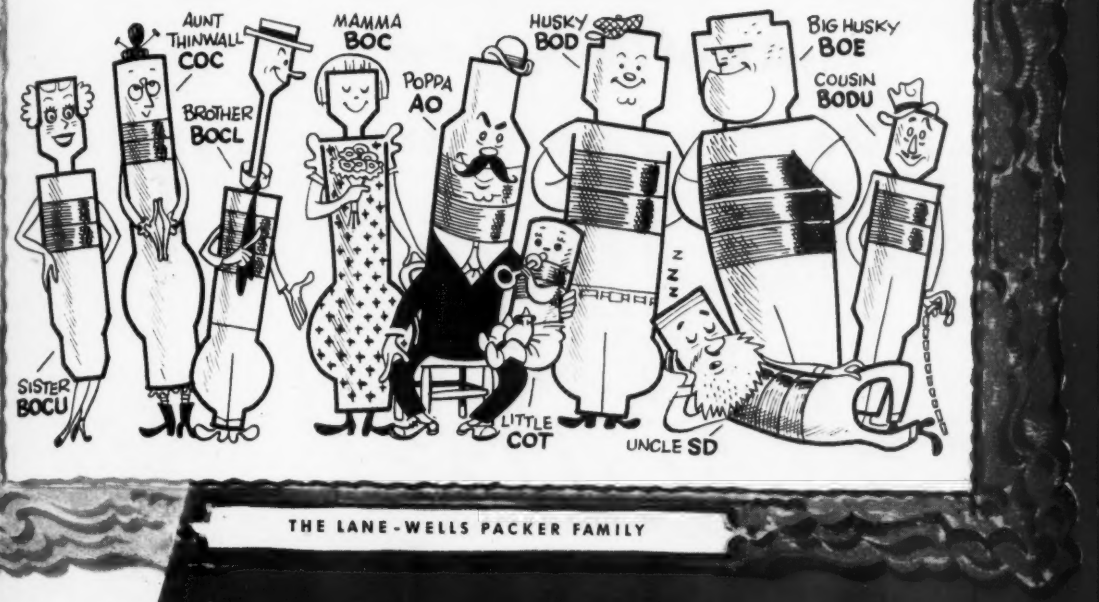
INDIAN ORCHARD
MASSACHUSETTS



ve you ever met the whole family?

Seldom has this hardworking family gathered together for a family group picture—in fact, this may be the only portrait of the Lane-Wells Packer family as a unit. So, step up and meet the family, one by one.



THE LANE-WELLS PACKER FAMILY

AO— a hookwall production packer, good in dry casing, or where fast running in fluid isn't essential, and a circulating valve isn't needed.

BOC— the nearest thing to a universal packer, gives casing-to-tubing packoff in most average-duty uses, runs fast in fluid, and has a circulating valve for pressure equalization.

BOCL— finds its greatest use in deep wells, where tubing stretch is considerable. The long-stroke valve assures positive action, with no danger of unseating the packer. This packer to call for when you have testing or acidizing jobs to perform under extreme conditions.

BOD— husky—is the packer that can take the punishment of really tough conditions—extreme pressures, heat and the like—under the toughest testing jobs. Use with BOC as the upper packer of a two-packer setup on all kinds of testing, injection, acidizing and repressuring jobs.

BOE— big husky—companion of BOD when the set-up calls for a two-packer combination for heavy-duty testing, acidizing or washing.

BODU— cousin—a thinwall packer which gives casing-to-casing packoff where space will not allow the use of a standard packer, and is used for a wide variety of average-duty uses.

COC— brother—baby of the family—is a thinwall, tubing-to-tubing packer made in the smallest sizes to give positive packoff between macaroni string tubing for use similar to the COC.

COT— little—a valveless anchor packer often used where clearance between casings is too small for hookwall packers.

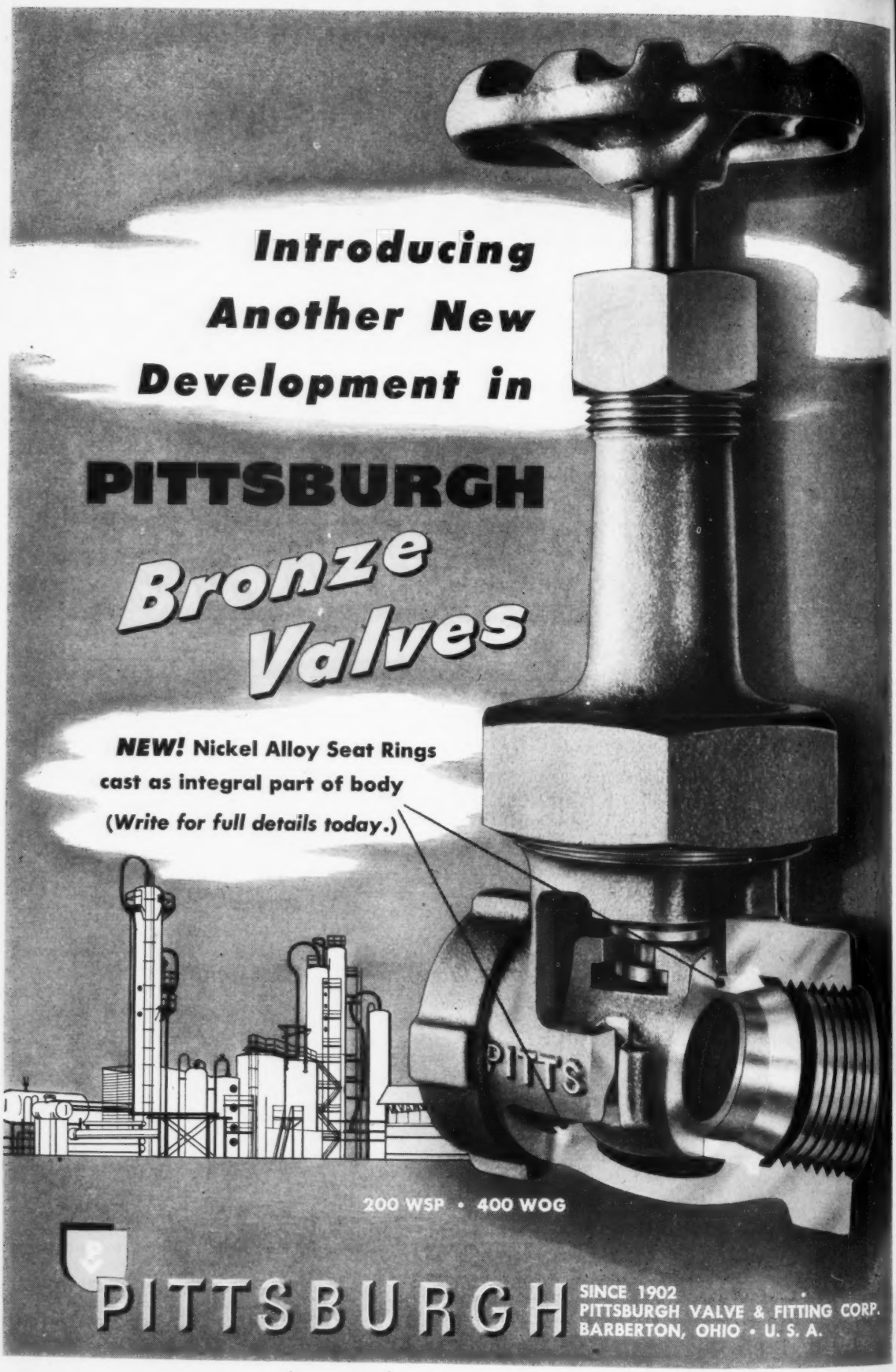
SD— uncle—

There's lots more to tell about every member of the family—but you can find it all in their "family album"—the Lane-Wells section in your Composite Catalog...or your Lane-Wells representative will be glad to tell you all about any of them, and what they can do for you.

LANE-WELLS COMPANY

TECHNICAL OILFIELD SERVICES

GENERAL OFFICES, EXPORT OFFICES AND PLANT
5610 SO. SOTO STREET, LOS ANGELES 11, CALIFORNIA
24-HOUR SERVICE • 24 BRANCHES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Another New
Development in
PITTSBURGH
Bronze
Valves
NEW! Nickel Alloy Seat Rings
cast as integral part of body
(Write for full details today.)
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200 WSP • 400 WOG
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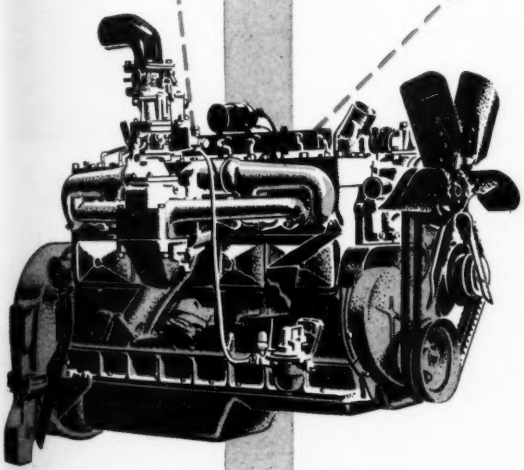
SINCE 1902
PITTSBURGH VALVE & FITTING CORP.
BARBERTON, OHIO • U. S. A.

FOR A BETTER DAY'S WORK

IN FORESTS—ON FARMS—IN OIL FIELDS—IN INDUSTRY AND ON THE HIGHWAYS!



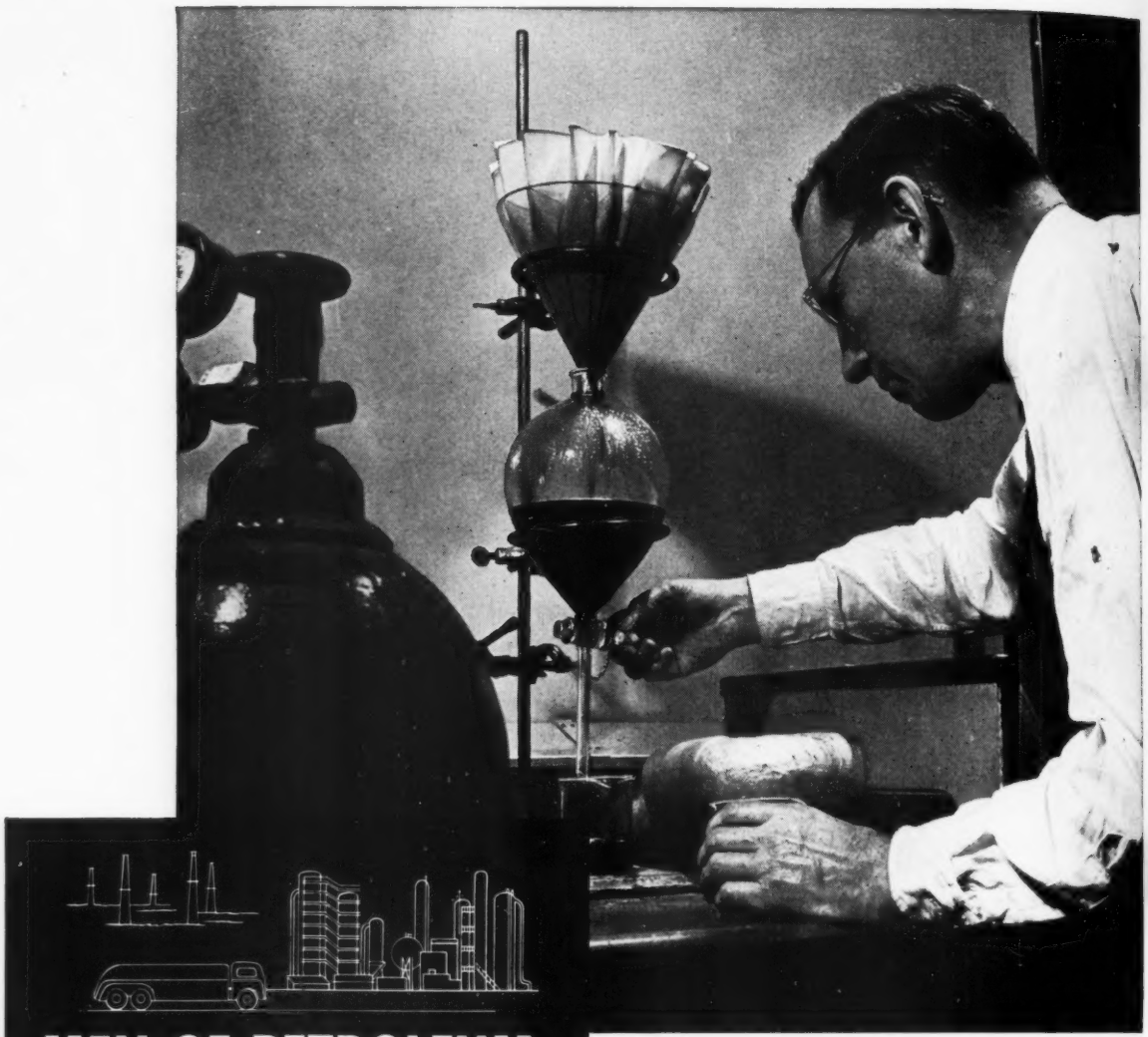
● Day after day . . . year after year, more and more lumbermen are specifying Chrysler Industrial Engines and Chrysler Industrial Power Units. They have learned *on the job* that Chrysler Industrial power is tough, dependable and economical. They know that each engine is backed by the skilled engineering and famed production of Chrysler Corporation—assurance of Horsepower With a Pedigree. You can count on Chrysler Industrial Engines For a Better Day's Work!

CHRYSLER

INDUSTRIAL ENGINES

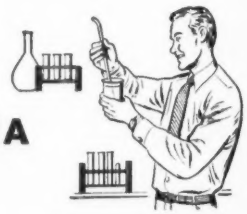
HORSEPOWER WITH A PEDIGREE

INDUSTRIAL ENGINE DIVISION, CHRYSLER CORP., 12200 E. JEFFERSON, DETROIT 31, MICH.



MEN OF PETROLEUM..

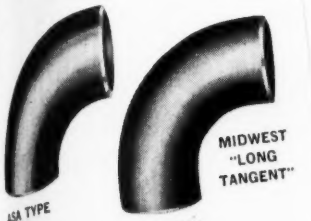
RESEARCH EXPERT... He is the scientist, the creator, the trained mind behind every scientific advancement... the man who has developed more than 5,000 valuable products from a single commodity: petroleum. He has perfected synthetic ether for hospitals... oil that lubricates for thousands of hours... asphalt for better highways... sprays to protect the farmers' produce and *your* food... food preservatives and detergents for household cleaning... spectacular new improvements for metal-cutting, electronic, automotive and aviation industries. He works with the latest scientific equipment in the most modern research laboratories—today's workshops for tomorrow's new technological age.



STANDARD OIL COMPANY OF CALIFORNIA

IMPROVE PIPING DESIGN and REDUCE COSTS with . . .

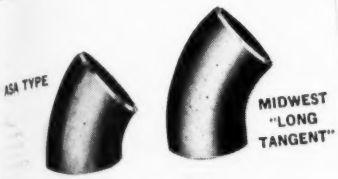
MIDWEST WELDING FITTINGS



90° ELBOWS

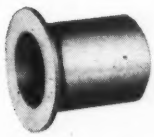
REDUCING ELBOWS

TEES

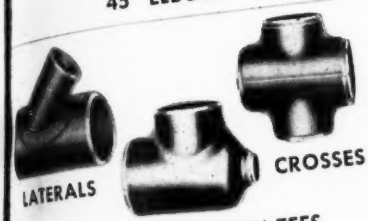


45° ELBOWS

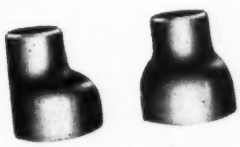
180° RETURNS



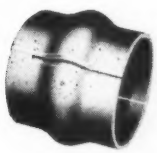
LAP-JOINT STUB ENDS



REDUCING-ON-RUN TEES



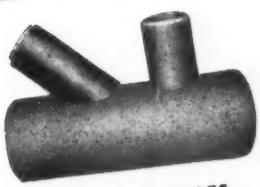
REDUCERS



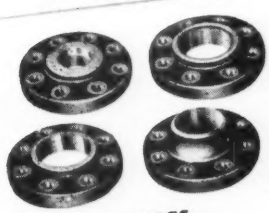
SLEEVES

CAPS

SADDLES



SHAPED NIPPLES



FLANGES

To simplify and improve piping design, Midwest originated and developed many of the fittings shown here. For example: the Midwest Reducing Elbow (available in sizes including 12") decreases turbulence and pressure drop when used instead of a standard elbow and a reducer; more than one third of the welding is also saved. Midwest Long Tangent Elbows save pipe and time in lining up. Midwest Saddles compensate for weakening of header body resulting from metal removed for nozzle opening. Midwest Welding Fittings stocks are carried in all principal cities . . . get in touch with your distributor.

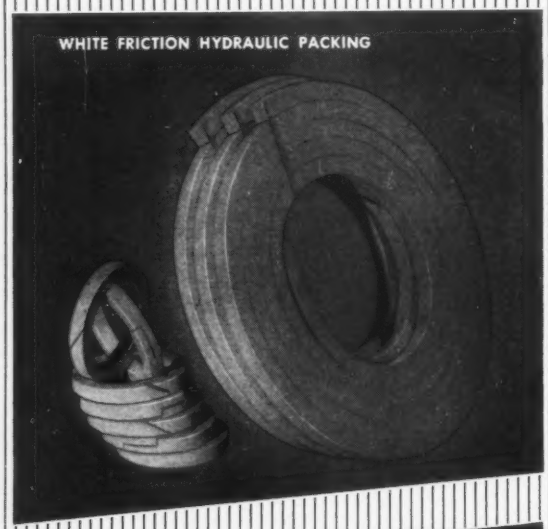
MIDWEST PIPING AND SUPPLY COMPANY, Inc.

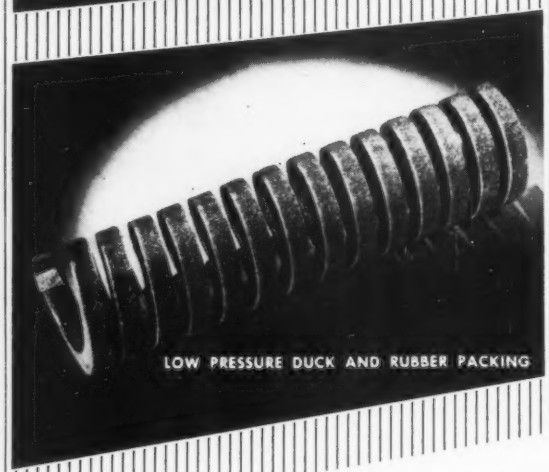
Main Offices: 1450 South Second Street, St. Louis (4), Mo.

Sales Offices: New York (7), 30 Church St.
Chicago (3), 79 West Monroe St. • Los Angeles (33), 520 Anderson St. • Houston (2), 229 Shell Bldg.
Tulsa (3), 533 Mayo Bldg. • South Boston (27), 426 First St. • Distributors in Principal Cities.

LINEAR PACKIN

FITS LIKE THE PAPER ON THE WALL





EXPORT: 230 Park Avenue, New York, 17, New York

JONES & LAUGHLIN SUPPLY COMPANY

Stores and Offices in 17 States

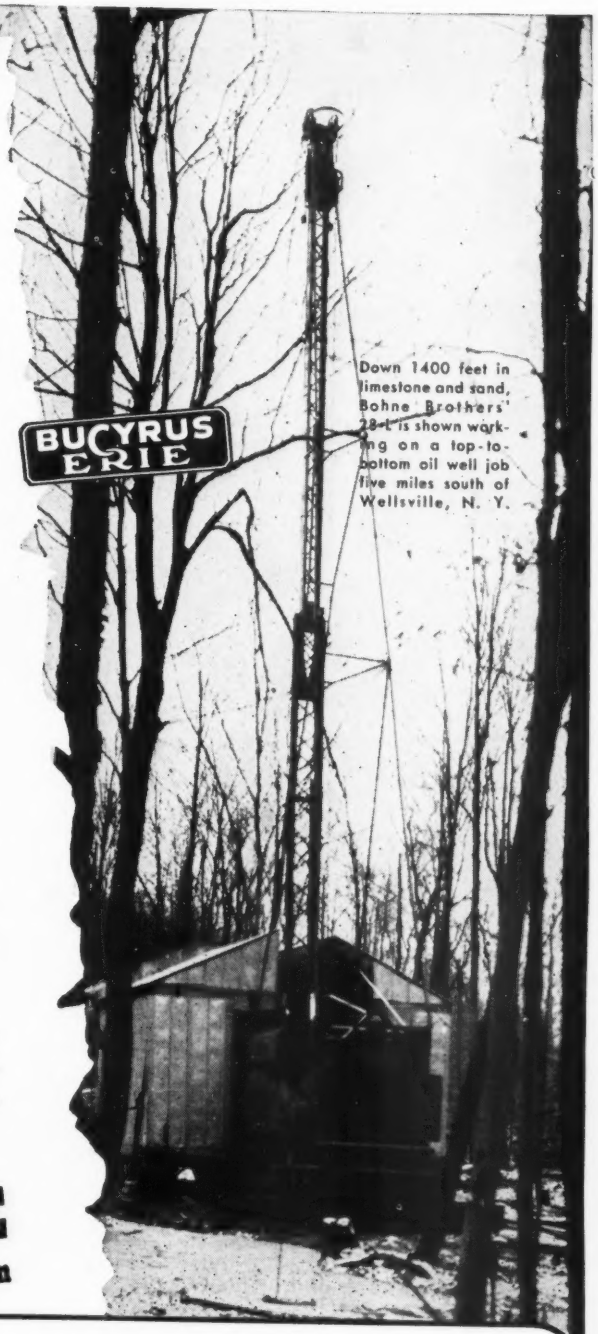
Subsidiary of Jones & Laughlin Steel Corporation

General Office...

TULSA, OKLAHOMA

J&L STEEL

40,654 Feet in 18 Months with a 28-L SPUDDER!



Down 1400 feet in limestone and sand, Bohne Brothers' 28-L is shown working on a top-to-bottom oil well job five miles south of Wellsville, N. Y.

Averaging 54 feet per eight-hour shift, Bohne Brothers, drilling contractors of Wellsville, New York, recorded this footage in drilling top-to-bottom oil and water-input wells.

Drilling speed like this — plus extreme mobility and versatility — can make money for you on your drilling and servicing jobs!

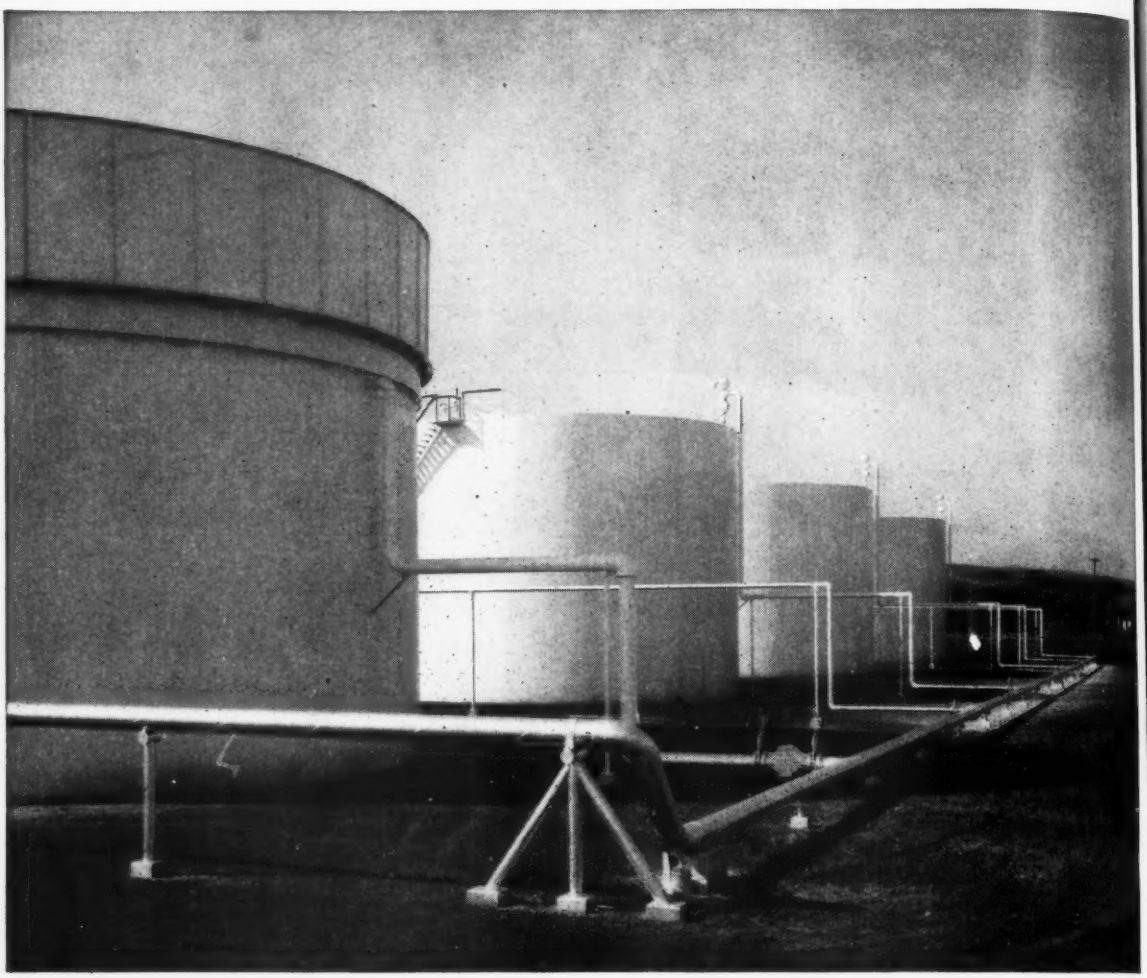
BUCYRUS·ERIE
South Milwaukee, Wisconsin

38S47

See for Yourself!

Check with your nearest Bucyrus-Erie Spudder Distributor. He'll tell you where you can watch a Bucyrus-Erie Spudder on the job.

BEACON SUPPLY CO.	Borger and Pampa, Texas
BECKWITH MACHINERY CO.	Bradford, Pa.
DRILLERS SUPPLY CO.	Joplin, Mo.
DRILLING & MINING EQUIPMENT CO.	Los Angeles 21, Calif.
GREAT NORTHERN TOOL & SUPPLY CO.	Billings, Kevin & Cut Bank, Mont.; Casper, Wyo.
GROSS SUPPLY CO.	El Dorado, Kan.
IVERSON SUPPLY CO.	Tulsa, Okla.; Odessa, Tex.; Artesia, N. M.
THE McJUNKIN SUPPLY CO.	Charleston, W. Va.
OLYMPIC SUPPLY CO.	Seattle, Wash.
RANDALL-ZOGG SUPPLY CO.	Owensboro, Ky.
THE STRAKER SUPPLY	Mt. Pleasant, Mich.
TURNER VALLEY SUPPLY CO., LTD.	Calgary, Alta.
ZANESVILLE TOOL & SUPPLY CO.	Zanesville and Wooster, Ohio



PARTY LINE—REFINERY STYLE

It's the manifold line connecting standard cone roof tanks to a Graver Expansion Roof tank. Progressive refiners (and terminal operators) have found this "party line" the perfect solution to their vapor loss problems.

A closed system is formed with a single Expansion Roof tank and as many as eight cone roof tanks using the manifold line. As vapors expand due to rises in temperature or as they are displaced during filling operations, they travel through the manifold line into the vapor space of the Expansion Roof. The roof rises to accommodate these vapors and venting to the atmosphere is prevented.

When temperatures drop or pumping out takes place, the vapors travel back to the vapor spaces of the various tanks and the roof descends. There is no breathing in of moisture laden air.

For details on applying the "party line" system to your petroleum storage facilities, write today.

FABRICATED PLATE DIVISION

GRAVER TANK & MFG. CO., INC.

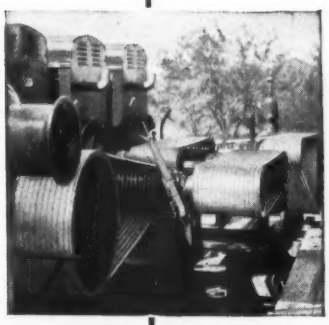
East Chicago, Indiana

Graver offers a complete service to the petroleum industry including Expansion Roof Tanks, Floating Roof Tanks and pressure vessels. In addition, Graver is prepared to furnish specialized steel plate work such as fractionating columns and class one vessels as well as stainless and alloy fabrication; water conditioning equipment of all types; and through its General Construction Division is prepared to handle all types of installation and erection work.

GRAVER

NEW YORK • PHILADELPHIA • CHICAGO • CATASAUQUA, PA. • HOUSTON • SAND SPRINGS, OKLA.

Gilmer BELTS



GILMER MULTIPLE V-BELTS... RUGGEDLY BUILT FOR LONG LIFE IN OIL FIELD SERVICE

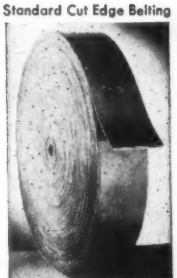
Gilmer Multiple V-Belts give you many "extras" to assure dependable performance in oil field service: —special non-slip grip, evenly matched lengths, controlled stretch, sturdy structure. Special constructions to withstand conditions of excessive oil, heat and static. Gilmer V-Belts bring you extra dividends in pulling power, long life and economy.

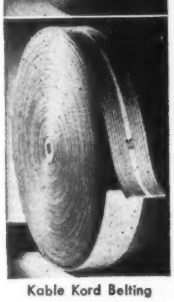
Whatever your V-Belt needs, Gilmer can fit them exactly, for there are Gilmer Multiple V-Belts, standard or special, endless and connected, for every type of drive.

Also, a complete line of flat belts manufactured by Gilmer includes the famous Kable Kord "2 belts in one" . . . contactor and power . . . as well as cut edge belts. The Endless type consists of continuous cord construction that reduces stretch practically to zero.

Whatever your power belt needs, Gilmer has the *right belt* to fit them. Gilmer engineers will be glad to help with any of your belting problems.

Standard Cut Edge Belting





Kable Kord Belting

Write now for your FREE copy of the Gilmer Guide. It contains engineering data that will help you get maximum service from your V-Belt drives.

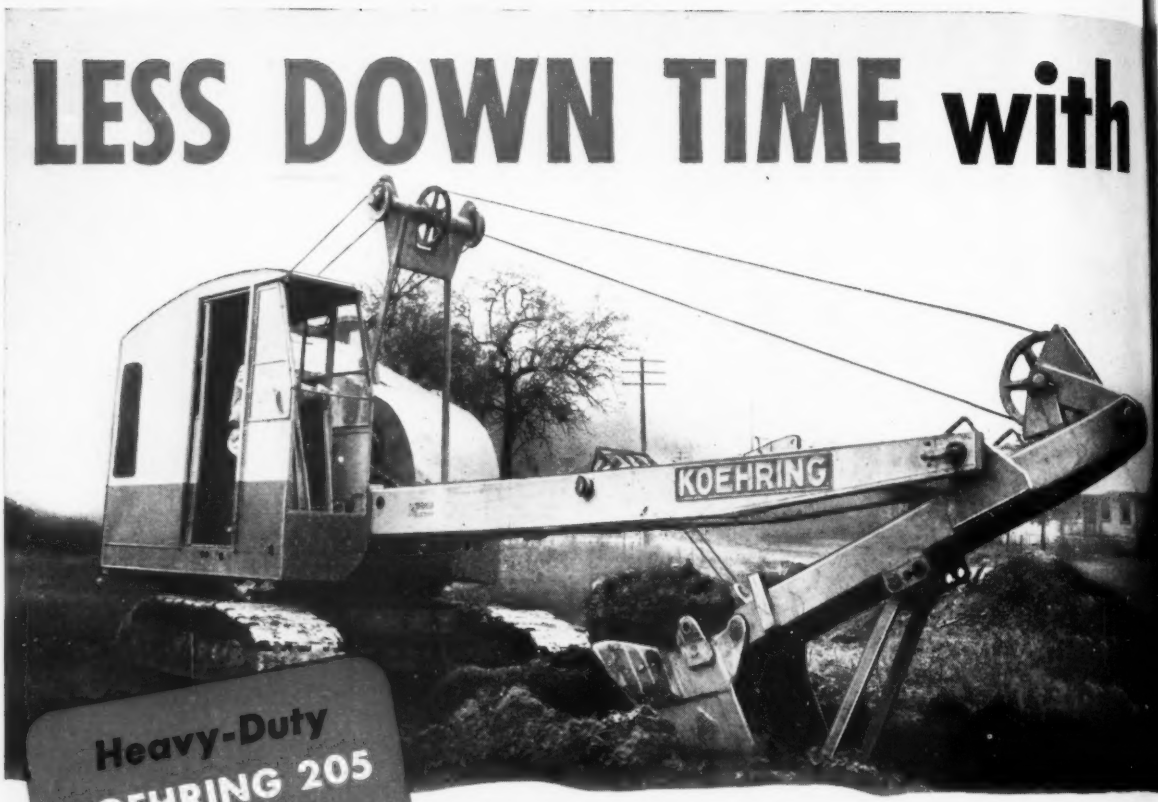
BUY THROUGH YOUR GILMER DISTRIBUTOR

L. H. GILMER COMPANY—Tacony, Philadelphia 35, Pa.

Division of United States Rubber Company

V-Belts . . . Flat Belts . . . Hose . . . Packing . . . Wire . . . Tape

LESS DOWN TIME with



Heavy-Duty KOEHRING 205 PULL SHOVEL

for your toughest trench jobs

For trenching through the hardest materials on your roughest oil field and pipeline work, you can keep production high and costs low with Koehring 205 heavy-duty pull shovel. Built heavy and tough throughout to take the beating of oil field service, it gives you less down-time, more work-time.

Husky shovel boom *plus* rigid dipper stick are extra strong for digging through rocky materials, hold alignment . . . dipper never turns away from cut. Long, deep digging reach to 15'-3", powerful ½-yard bite and easy dumping mean high output on tough trenching jobs. Double fulcrum clutch that reduces amount of manual operating effort . . . independent traction to travel, swing and operate boom all at the same time . . . and boom that handles both pull-shovel and crowd shovel work, are just a few of many Koehring 205 features that assure you more production at lower cost.

In addition to pull shovel and crowd shovel, this Koehring 205 can also be quickly converted to dragline, clamshell, crane or pile driver . . . is available on crawlers, pneumatic tires or truck mounted, to meet the specialized type of work required for oil field operating conditions.

Your Koehring distributor is experienced in oil field problems . . . will analyze your trenching, excavating and other materials-handling requirements in the interests of greatest efficiency, production and savings for you. For complete facts and figures, see your Koehring distributor today. In Texas it's ALAMO IRON WORKS, San Antonio . . . BARTHOLOW MACH. CO., Dallas . . . GOODMAN BROS., Midland . . . F. S. RAY CO., Houston. In Oklahoma see CLARENCE L. BOYD CO., Tulsa and Guthrie. You'll find Koehring distributors ready to work with you in all other major oil field centers, as well.

A size to suit every job:

Koehring 205	Shovel, Pull Shovel — ½ yard Crane Lifting Capacities: Crawlers: 13,800 lbs. Truck: 20,000 lbs.
Koehring 304	Shovel, Pull Shovel — ¾ yard Crane Lifting Capacities: Crawlers: 23,100 lbs. Truck: 40,000 lbs.
Koehring 605	Shovel, Pull Shovel — 1½ yard Crane Lifting Capacity: Crawlers: 60,760 lbs.

Crawlers: 75% Rating — Truck: 85% Rating.

KOEHRING HEAVY-DUTY

KOEHRING COMPANY
Milwaukee 10, Wis.

these TOUGH DIGGERS

Fast PARSONS 200 wheel TRENCHLINER*

*Reg. Trade Mark

digs a mile of pipeline a day

Where you want to push through every possible foot of pipeline trench per day, Parsons 200 wheel Trenchliner is the big-production, lowest cost answer. Because it digs as fast as 20' per minute, this pipeline Trenchliner sets a fast pace for your pipe gang . . . puts gasoline, oil and natural gas lines through in a hurry. A mile a day is not uncommon. Trenchlines 15" to 26" wide, up to 5'-6" deep . . . delivers clean, smooth-walled, round-bottomed trenches, ready to receive pipe without the added cost of hand trimming.

And you get this dependable, high-production digging day after day, because the Parsons 200 Wheel Trenchliner is built big and tough, with high quality in every detail. Heavy-duty wheel is supported at 4 points, is held firmly at bottom by 2 double-wheeled dollies where digging pressure is greatest . . . arched wheel-frame is truss-bridge constructed, rigidly supports both digging wheel and conveyor . . . resists distortion, keeps wheel precision-aligned for accurate grading. All main operating gears are fully enclosed in steel cases, run in continuous oil baths . . . minimize maintenance, reduce friction loss to minimum, give you longer, trouble-free service.

For complete facts and figures, see your Parsons distributor today. In Texas it's ALAMO IRON WORKS, San Antonio . . . BARTHOLOW MACH. CO., Dallas . . . GOODMAN BROS., Midland . . . F. S. RAY CO., Houston. In Oklahoma see CLARENCE L. BOYD CO., Tulsa and Guthrie. You'll find Parsons distributors ready to serve you in all other major oil field centers, as well.

Check these Model 200 features:

DIGGING WIDTHS.....	Buckets only:	15"	18"	21"
	With side cutters:	20"	23"	26"
DIGGING DEPTH.....	5'6"			
DIGGING SPEEDS.....	50 — from 2.5" to 236" per min.			
TRAVELING SPEEDS.....	5 — from ½ to 2.7 M.P.H.			
CONVEYOR BELT SPEEDS.	5 — from 45 to 330 feet.			
POWER.....	Gas — Waukesha 6 cyl., 55 H.P.			
	Diesel — International 4 cyl., 55 H.P.			
TRACTOR TYPE CRAWLERS	Optional equipment for pipeline work.			
TILE BOX.....	Optional — for tile laying.			
SPECIAL GUMBO LIP.....	Optional — replaces teeth for digging in gumbo.			

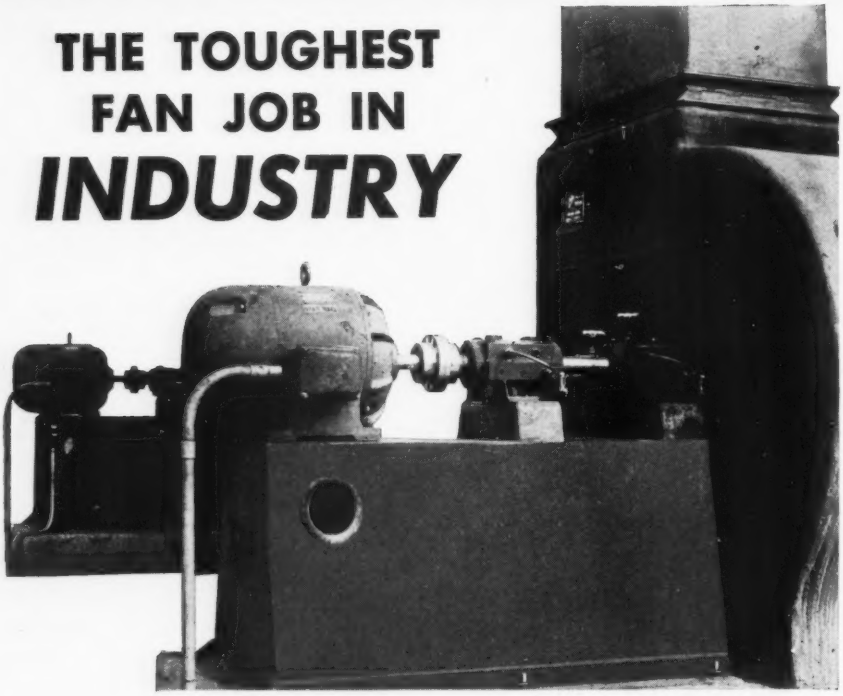
Trenchliners also available in 3 other sizes.

PARSONS HEAVY DUTY

The PARSONS COMPANY
Newton, Iowa
Koehring Subsidiary

AIR EQUIPMENT TO HELP YOUR BUSINESS

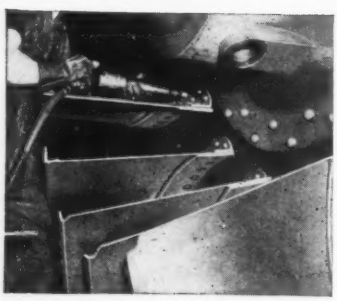
THE TOUGHEST FAN JOB IN *INDUSTRY*



INDUCING DRAFT ON BOILERS IN TEXAS PIPE LINE STATION

"Buffalo"

INDUCED DRAFT FANS ARE BUILT TO *"TAKE IT"*



Drawing large volumes of air charged with fly-ash at high temperatures is the most punishing form of continuous fan service. "Buffalo" Fans like the above are doing this job with minimum time out for servicing. Wheels and housings are built with metal properly distributed to withstand the high stresses. Renewable wearing stips on blades, and renewable scroll liners are available where needed. Bearings and shafts are strictly heavy duty. *Before you select a draft fan, look into the long-life and efficiency features of the "Buffalo" line — write for Bulletin 3190-B.*

← Strength where strength counts! Hot riveting heavy-gauge blades to the center plate of "Buffalo" Induced Draft rotor.

BUFFALO FORGE COMPANY

525 Broadway, Buffalo, New York

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

Branch Offices in all Principal Cities

FANS by "Buffalo"

EQUIPMENT FOR

★ VENTILATING

★ HEATING

★ COMFORT COOLING

★ PROCESS COOLING

★ AIR TEMPERING

★ AIR WASHING

★ EXHAUSTING

★ BLOWING

★ FORCED DRAFT

★ INDUCED DRAFT

★ PRESSURE BLOWING

★ CLEANING

★ DRYING

CUTTING AIR COSTS IN EVERY BRANCH OF INDUSTRY

ROLLWAY'S Tru-Rol Cylindrical ROLLER BEARING

The NEW Bearing with
"Guide-Lips"

LONGER LASTING!
BETTER PERFORMANCE!
MORE ECONOMICAL!

Broad lip flanges, curved to the shape of cylindrical rollers, assure true axial alignment . . . maintain a thin film of lubrication on rollers . . . reduce retainer friction . . . minimize wear.

TRU-ROL Bearings Give
LONGER PERFORMANCE at *LOWER COST*

Tru-Rol design and construction add up to precision operation . . . and long dependable service . . . *at a considerable saving.* Specify TRU-ROL . . . and get the high standards of workmanship and materials that have distinguished Rollway Bearings for over 40 years.

For True rolling . . . The *NEW*
TRU-ROL Bearings have "GUIDE-LIPS"

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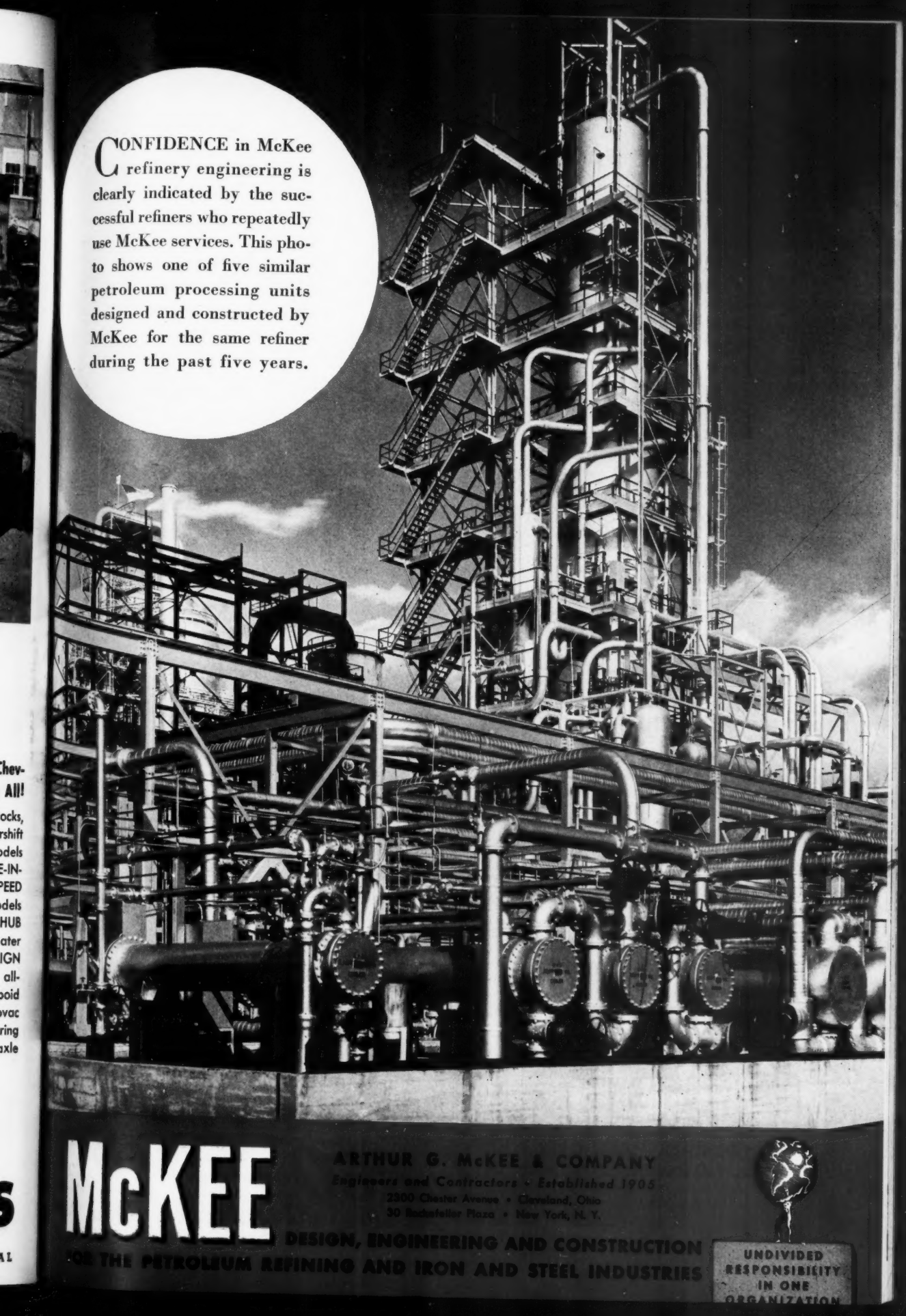
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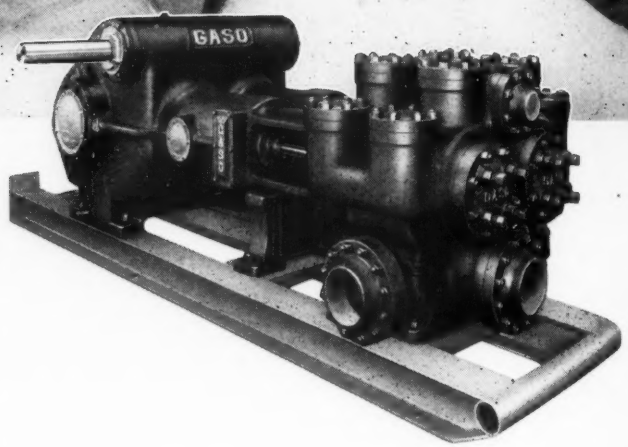

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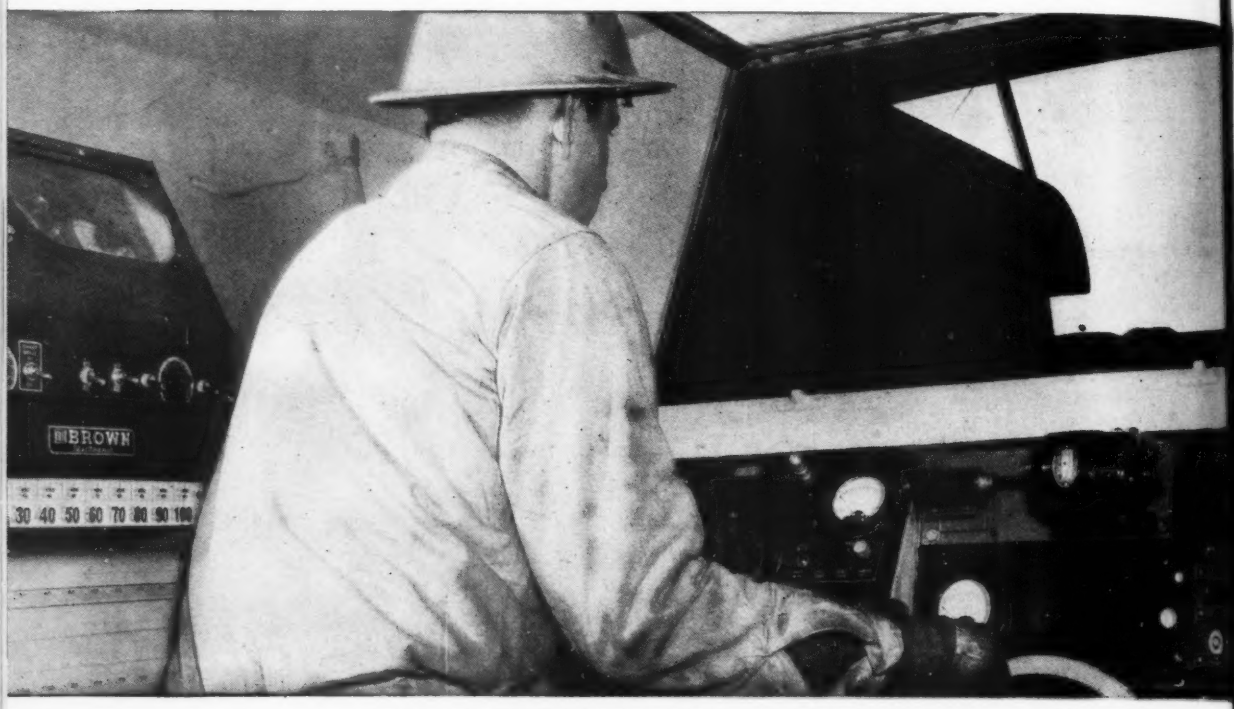

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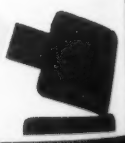

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Politics

THE price-control proposals that have been introduced in the special session of Congress should be interpreted for what they are—politics with a background of a presidential election 3 months away.

The bills are ambiguous as to provisions, the sponsors obviously hoping that those connected with every phase of our economy will assume that the regulations will apply to others but not to them. What is wanted is a general law which will permit specific applications wherever and whenever they are deemed politically expedient.

There is no question but what petroleum would be included in the enforcement of a price-control act should it be enacted as now planned. While the petroleum supply-demand situation is improving steadily, partially because the industry has had the needed price assistance, it would not be difficult in view of conditions to find the required "short supply" or some other excuse, and oil operators shortly would find themselves right back where they were in OPA days.

The explanation offered for a return of emergency price controls is that they are needed to curb inflationary trends and end the cost-of-living spiral. As this page long ago pointed out, upward price trends of the past few years are effects, not causes.

It is ridiculous to insist on federal budgets, as this administration has done, three to five times those prevailing in the heyday of the New Deal and 15 to 20 times those of the late twenties, and assume that the enforcement of a few more new laws will bring a return to prewar price levels.

For more than a decade Government in this country has been directed to the reduction of the purchasing power of the dollar. Always there has been an attempted justification for some new action emphasizing this trend, but never has there been any serious effort to deal with diseases rather than symptoms. To the destructive developments in our domestic affairs have been added most of the burdens of the most destructive war of all time.

Inflation is one of the inevitable results. Wages and salaries have been boosted in an attempt to catch up with the depreciated dollar, leading to a vicious circle which gets nowhere. The buying power of savings of millions, including those which make possible a 250-billion-dollar national debt, has been reduced more than one-third.

There is no simple way out. More laws and the extension of governmental powers are not the answer.

The oil industry and all industries which have stood on their own feet in these critical times account for whatever recovery and stability there have been in this postwar period. Their activities should not now be circumscribed by new edicts of Washington applied under the guise of price controls and other governmental panaceas.

Oil Industry Gets Military Ultimatum As NPC Studies Supply-Demand Outlook

by Bertram F. Linz

WASHINGTON.—Miltiary petroleum requirements must be given precedence over all others, and failure of the industry immediately to provide the products for which the armed services have called will result in invocation of the priority-allocation authority granted the President in Section 18 of the new selective service act, members of the National Petroleum Council were told at their quarterly meeting July 29.

In caustic criticism of the industry's failure readily to meet these requirements, Rear Adm. E. D. Foster, chairman of the Armed Services Petroleum Purchasing Board, told the council he would give the companies "one week" in which to provide assurance that all needs will be met in full. Failing that assurance, he said, the military will call on the various companies for such quantities of products as it requires and negotiate price afterwards, as authorized by the draft law.

Company presidents attending the meeting indicated immediately that they would take steps to remedy the situation.

Earlier in the week, Foster told the House interstate commerce committee that the immediate position "doesn't look too bad," but apparently gave the council information which he told the committee he would prefer to submit in executive session, involving the serious long-range possibilities raised by the Berlin blockade and the projected expansion of military forces.

"Get Tough" Policy

The discussion developed that while some companies have gone to great lengths to provide military supplies, there has been trouble in meeting requirements and it frequently has been necessary to "get tough" with the industry to get product for immediate shipment. This point has been emphasized repeatedly by the Armed Services Petroleum Board in laying its requirements programs before the industry.

It was also brought out that while some companies sell the Government at the bottom of the market others seek to obtain higher prices. The military believe they should be treated as "old, established customers," entitled to buy at the lowest prices.

There has been a gradual stiffening of the military's attitude toward the industry for some time, and only recently the Defense Department found it necessary to deny that Secretary James V. Forrestal had threatened to take drastic action if the necessary oil supplies were not immediately forthcoming. It was admitted to the council, however, that the really tough position now taken is a result of the Berlin situation, which might branch out into something worse overnight.

At a press conference following the meeting, NPC Chairman Walter S. Hallanan declared emphatically that "this industry isn't going to let down the armed forces so that relief cannot reach Berlin," and Max W. Ball, director of the Oil and Gas Division, stressed the assurance of industry leaders that the military will have no further complaint.

Ball Will Stay

A major achievement of the NPC meeting was the gaining of a reluctant consent from Max W. Ball to remain as director of the Oil and Gas Division until after the next council session, which was set for October 14. Because of the political uncertainty it has been impossible to induce anyone to take over Ball's job at this time, but he was persuaded to stay on, Hallanan said, only "at the unanimous and earnest request of the NPC and a strong appeal by Secretary Krug."

Crude availability in the United States will reach an average in excess of 5,700,000 bbl. daily by the second quarter of next year, and by the middle of 1949 may top 5,800,000 bbl. a day, it was predicted in a report by a council committee which has been studying the subject.

Exploration and development has increased more than was anticipated a year ago, but so far no part of the large deficiency in drilling which occurred during the war has been made up, and the total well deficiency—now about 75,000—continues to grow, the committee said.

"Long-curtailed drilling activities on account of war controls and material and equipment shortages have absorbed substantially all of the domestic excess reserve crude-oil productive capacity," the council was told, and, the committee added, "it is of vital importance, if this country is to be adequately prepared for a national emergency, that the petroleum industry remain free of government restraints and controls and have available to it, in sufficient quantities, the necessary operating and capital funds, materials, and manpower to pursue with increasing vigor, drilling and expansion programs designed to restore as rapidly as possible a safe margin of reserve petroleum productive capacity in excess of crude-oil demands and production."

Crude Still Short

Given the necessary materials, productive capacity will be increased substantially, but it was warned that greater quantities of steel must be channeled into the production of pipe and oil-field equipment if the industry's development and production programs are to be carried out this year and next.

The committee's studies indicated that daily average production will increase from 5,500,000 bbl. indicated by the Bureau of Mines preliminary estimate for the second quarter of this year, to 5,567,100 bbl. during the current quarter, 5,618,407 bbl. next quarter, 5,653,202 bbl. in the first quarter of next year and 5,706,124 bbl. in the succeeding quarter.

Except for some shut-in production in the Rocky Mountain area, estimated at about 38,000 bbl. daily, crude production in this country is substantially up to maximum efficient productive capacity, the report showed. However, it was added, while increased exploration and development since the war has added substantially to the net productive capacity, with new productivity more than offsetting declines in the older fields, practically no headway has been gained over increasing crude requirements.

Refineries Near Limit

In another report, Robert E. Wilson, chairman of the committee on refining capacity, estimated that the over-all capacity will be raised by at least 74,000 bbl. by the end of this year, but warned that with refineries now operating at close to 99 per cent of capacity any further sizable increase in demand will present new problems.

Even the relatively inefficient refining units are now operating substantially at capacity for the first time since World War I, and during the 12 months ended June 30, last, much worn-out equipment was offset

and about 197,000 bbl. daily of additional capacity provided, the report stated.

"Regardless of this," Wilson said, "it is quite apparent that the expansion of refinery throughput which has recently set new high records almost every month must flatten off from now on. . . . In spite of almost superhuman efforts to expand refinery capacity, in the face of high construction costs and steel shortages, it appears that refinery capacity is likely to be a serious bottleneck during the next 12 months if the increase in demand continues."

In view of the uncertainties of the situation, the council adopted a suggestion by Wilson that the committee undertake a new survey in September to cover the projected expansion through 1949.

L.P.G. Improving

A study of the liquefied petroleum-gas situation by a committee headed by W. K. Warren showed that production is still above demand but the margin now is so close that both producers and distributors should build up their storage facilities to save the maximum volume for ultimate utilization.

The committee also called for construction of storage at points strategic for short-haul distribution, in the interest of conserving transportation equipment, and for curbs on the installation of new consuming equipment unless firm contracts for L.P.G. requirements can be made in advance.

Because of the lack of information regarding facilities under construction or planned, the committee refrained from attempting to estimate the probable production for this year or 1949, but did calculate that on the basis of operations at the end of last year the production might reach 3,263,881,600 gal. this year and 3,771,886,600 in 1949, while demand may be 3,104,102,000 gal. this year and 3,755,220,000 next year. Thus, while production would exceed demand this year by 69,780,000 gal. the surplus would be only 16,667,000 in 1949.

"Now that annual demand is creeping so close to annual production," the committee warned, "only by saving excess production in periods of light demand can the industry cushion itself against those seasonal periods when demand on a current basis far outstrips current production."

Steel Outlook Surveyed

A discussion of the gray market and the manner in which oil-industry steel slips out of the regular channels of trade marked a report by Russell B. Brown on the progress of the voluntary allocations of material sought by the industry from the steel producers.

Brown reported that the two agreements to be reviewed at public hearings by the Commerce Department this week, relating to field tanks and surface production equipment and barges, will cover a little over 400,000 tons of steel, or only 4 per cent of the industry's total needs. Another 2½ per cent will be covered by a tanker program now being formulated, but no progress is being made with respect to tubular goods, which represent about 50 per cent of the total requirements, largely, he explained, because the steel industry feels that since present production is at a maximum no useful purpose would be served by an agreement.

However, Brown added, "it is apparent that the petroleum industry's increased needs for tubular goods have been recognized by the steel industry and a substantially larger tonnage is being made available even though no voluntary allocation plan is in effect or under immediate consideration."

A strong plea for continued cooperation between the industry and the Government was made by Secretary Krug, who emphasized that the necessity for such cooperation is greater today than ever before because of the international situation and domestic political turmoil.

Will Study Manpower

The council ratified the agenda committee's approval of the appointment by Chairman Hallanan of a committee to restudy the PIWC report on national oil policy, and the creation of a committee on manpower in the petroleum industry to study, estimate, and report on the present manpower engaged in the industry.

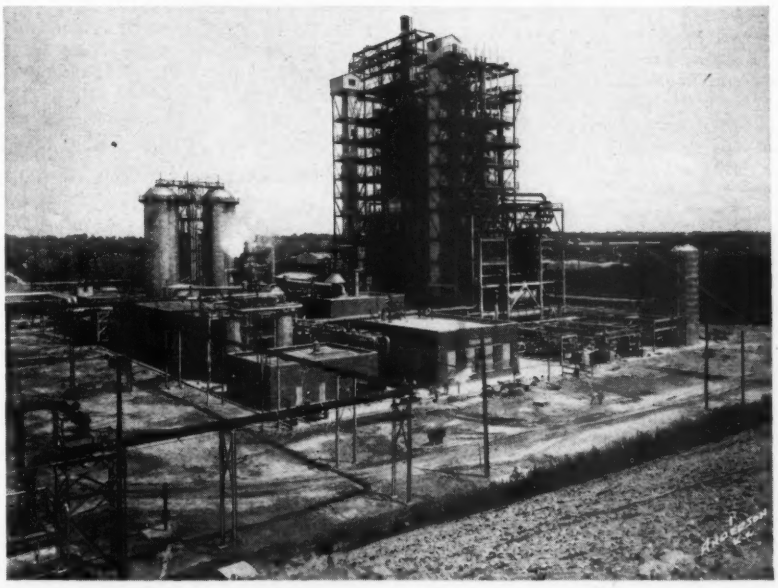
The manpower study was requested by OGD Director Ball following discussions with representatives of the National Security Resources Board and the Armed Services Petroleum Board, who stressed the need for detailed information concerning present employment in the industry as a basis for estimates of what would be needed in the event of war.

The investigation will cover present employment by functional divisions, occupations and skills, and geographic areas; and the adequacy of currently available employment data and the improvement of any deficiencies that may be found.

A plea for company assistance in finding the men needed to staff his office in the Economic Cooperation Commission was made by Walter Levy, director of the petroleum division, who explained the work and functions of ECA in the field of oil, which represents 20 per cent of the $5,000,000,000 the agency will spend this year for European recovery.

Levy said he needs three top men to handle programming and screening, operations, and petroleum equipment, but admitted that the maximum salary ECA cap pay is only $8,509 a year. In addition to the top officials, he is attempting to recruit a staff of seven in subordinate positions, but so far has been unable to induce any men of the requisite caliber to accept positions.

NEW CRACKING UNIT IN OPERATION



The new fluid catalytic cracking unit of the Sugar Creek, Mo., refinery of Standard Oil Co. (Ind.) will be opened to inspection by civic leaders and representatives of the press in the Kansas City area August 12. Construction of the unit was started in January 1946, and it went on stream this July. The refinery was located at Sugar Creek in 1904 and has been expanded until it now has a capacity of 35,000 bbl. of crude per day. The new cracking unit has a capacity of 25,000 bbl. per day of fresh feed

Farm Co-ops Buy Out Premier Co.; Five Refineries Included in Deal

THREE Middle West farm cooperatives last week bought for a total of $8,500,000 four refineries in Texas and one in North Louisiana with an aggregate crude-oil capacity of 23,000 bbl. daily.

Four of the plants were properties of Premier Oil Refining Co., Longview, the entire stock of which was acquired by the cooperatives. The fifth was bought in a separate transaction from Woodley Petroleum Co.

The cooperatives are Illinois Farm Supply Co., Chicago; Midland Cooperative Wholesale, Minneapolis; and Farmers Union Central Exchange, Inc., South St. Paul, Minn. They distribute petroleum products to their members of an area consisting of Illinois, Iowa, Minnesota, Wisconsin, North and South Dakota, Montana, and Wyoming.

Premier was purchased for $7,500,000. With it, the co-op group acquired refineries at Fort Worth, Arp, and Longview in East Texas, and Cotton Valley, La. The Arp plant has been operated through the subsidiary, Independent Refining Co. The Cotton Valley plant has been shut down since March 1946. The others are operating.

Gets Extensive System

Capacities of these refineries, crude oil and cracking, and May runs, are in barrels daily: Fort Worth (which also manufactures lubes and waxes), 7,000, 5,000, and 8,006; Arp, 4,500, 5,000, and 4,330; Longview (the Greggton plant), 4,000, 4,800, and 4,148; and Cotton Valley, 5,000, skimming.

Premier operates a substantial gathering system in East Texas field and offers a 10-cent bonus above other posted prices for crude-oil supplies. The Fort Worth refinery is served by a common-carrier pipe line extending to the West Central Texas area. Jointly with Woodley Petroleum, it has about 500 to 600 bbl. daily net production in the West Central Texas area and in West Heidelberg field in Mississippi, and also some undeveloped lease holdings.

For about $1,000,000, the cooperatives acquired from Woodley its only refinery holding, the Baird Refining Co. plant at Baird, Tex., and Octane Oil & Refining Co., which markets in the area. This refinery has a crude-oil capacity of 2,500 bbl. daily, a cracking capacity of 2,750, and it runs in May were 2,462 bbl. daily. Woodley acquired the properties at Baird about 15 years ago. Woodley's management approved sale of the properties, and the company, whose headquarters are in Houston, will continue its major operation as an oil-producing firm.

Negotiations for acquisitions of the properties by the cooperatives were begun last November and the deal was closed July 27 in the Mercantile National Bank in Dallas. A part of the funds for the deal reportedly was obtained by the cooperatives from a federal banking agency.

The purchasing of the refining properties apparently was dictated by the present tight market in petroleum products and the desire of the cooperatives to obtain a dependable source of supply. Since the war, Gulf Coast refineries have been acquired by two East Coast marketing companies in similar moves.

In a statement made in Chicago, Fred E. Herndon, president of Farm Supply, said the cooperatives will be able to "better meet the increased demand of farms in the Midwest for the essential fuels needed for peak farm production." He said capacity of the refineries is about 180,000,000 gal. a year (about 12,000 bbl. daily), apparently referring to their production of major products. One of the leading representatives of the cooperatives in the purchase was J. L. Nolan, an oil man with experience in marketing and refining. He is with Farmers Union Central Exchange. Farm Supply Co., one of the other two cooperatives, is a subsidiary of the Illinois Agricultural Association.

Management Remains

To carry out the purchase and handle the properties, the cooperatives pooled their resources in a syndicate and organized Premier Petroleum Co. as a Minnesota corporation with a license to do business in Texas. Premier Oil Refining Co. will continue in existence as the operating company for the properties, thus occasioning no change in existing contracts and division orders. Sylvester Dayson, president of Premier and one of the former stockholders, will continue as president and general manager, and no change in policies and management will be made. Premier presumably also will operate the Baird properties.

Premier was organized in 1935 by J. R. Parten, Dayson, and Joe Zeppa, Tyler drilling contractor. Parten is president of Woodley Petroleum and prior to the recent purchase, chairman of the board of Premier. Parten, Dayson, and Zeppa comprised the former executive committee in the Premier management.

The privately owned stock in Premier was held by these three and by Myron G. Blalock, Marshall attorney, for Blalock Brothers; Roy H. Laird, Kilgore independent operator; Sam W. Ross, Kilgore independent; and Mrs. Opal Woodley Sherman, Washington. This group held more than 90 per cent of the shares.

The Fort Worth refinery was originally built by Transcontinental Oil Co. and was acquired by Ohio Oil Co. when it purchased Transcontinental. Ohio sold the plant to Premier in the mid-thirties. Premier bought the Arp plant from independent interests about 2 years ago. The company built the Longview and Cotton Valley refineries. The plant at Cotton Valley operated off stock from the Cotton Valley unit. The federal Government filed an antitrust suit against the Cotton Valley operators subsequent to the closing of the Premier plant, and the case is expected to come to trial shortly.

Delegates Named for Geological Congress

WASHINGTON.—The State Department last week announced the makeup of the United States delegation which will attend the first International Geological Congress to be held since 1937, which will meet in London August 25 to September 1.

Chairman of the delegation will be Dr. Eliot Blackwelder, professor emeritus at Stanford University and chairman of the United States Geological Survey Advisory Committee, and the delegates will be Dr. Leason H. Adams, director of the geophysical laboratory of the Carnegie Institution; Dr. James Boyd, director of the Bureau of Mines; Dr. Norman L. Bowen, petrologist of the Carnegie Institution; Dr. A. F. Buddington, professor of geology at Princeton University; Dr. Carl O. Dunbar, professor of geology at Yale University; Drs. W. D. Johnston, Jr., Herbert E. Hawkes, and Louis L. Ray, Geological Survey; and Dr. John F. Marble, chairman of the committee on geologic time of the National Research Council.

The main purpose of the congress will be to exchange scientific information on and to discuss the following geological subjects: Problems of geochemistry; metasomatic processes in metamorphism; rhythm in sedimentation; the geological results of applied geophysics; the geology of petroleum; the geology of sea and ocean floors; the pliocene-pleistocene boundary; the correlation of continental vertebrate-bearing rocks; and earth movements and organic evolution.

this week

GOVERNMENT—Armed Services threaten crack-down on oil industry unless bids are filled promptly. . . . But analysis shows military supplies are not far from requirements. . . . Price is a factor. . . . ¶Threat to stripper wells seen in administration request for authority to impose ceilings on oil prices. . . . ¶Demands for control of "monopoly prices" enter discussion of inflation curbs.

INDUSTRY—Farm Co-ops purchase entire Premier Oil Co., getting five refineries and other properties. . . . ¶Stanolind plans "biggest" production research center. . . . Many other companies are expanding laboratories. . . . ¶Offshore drilling program in Gulf keeps expanding. . . . ¶California encouraged by Cuyama Valley strike.

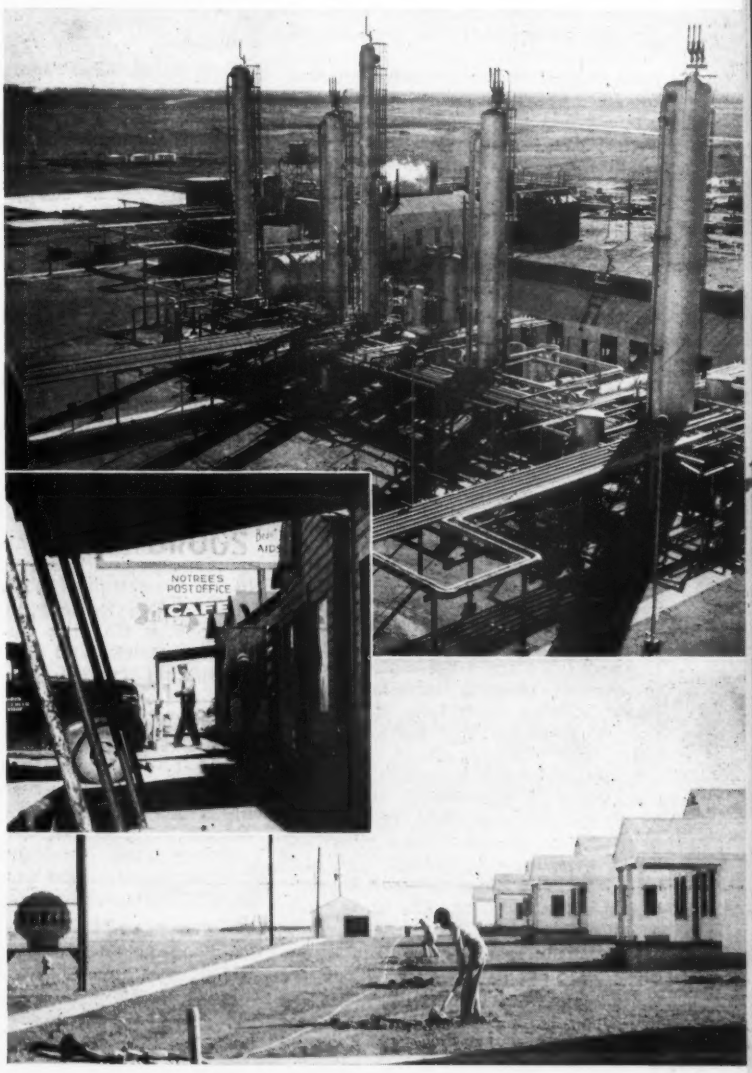
SUPPLY—NPC reports show supplies of petroleum products increasing. . . . Outlook optimistic for remainder of year. . . . But crude still tight, refinery throughput near limit, steel uncertain. . . . ¶California analysis shows West Coast supply and demand in balance. . . .

TRENDS—Gasoline stocks dropped only 60,000 bbl. for week ended July 24. . . . Compared to drops of 2,247,000 and 1,197,000 bbl. for the two previous weeks. . . . Stocks now stand at 14,686,000 bbl. above those of last year. . . . ¶Gasoline production shows higher percentage yield. . . . For week ended July 24 production was up 355,000 bbl. to total 17,879,000 bbl. . . . Despite a decline of 294,000 bbl. in crude runs. . . .

REFINING—Tide Water will build Thermofor catalytic cracking unit at its Drumright, Okla., refinery. . . . ¶Standard of Indiana opens new fluid cracker at Sugar Creek, Mo. . . . ¶One of the largest petrochemical plants on Gulf Coast remains closed by strike. . . . ¶Standard Oil Co. (Ohio) begins construction on new large catalytic cracking unit at its Lima refinery. . . . ¶Newly formed English company plans factory near Manchester, England, for production of copolymers of styrene. . . . ¶Sunray Oil Corp. doubles runs of company's own crude oil in first 6 months of this year. . . .

PIPE LINES—Sinclair Refining Co. lays products pipe line into Philadelphia area from its Chelsea, Pa., tank farm. . . . ¶Survey for the Tierra del Fuego crude-oil pipe line for the Government of Chile is completed. . . . ¶Preliminary survey of the Atlantic Pipe Line Co.'s Permian Basin-Gulf Coast crude-oil pipe line is completed. . . . ¶Piping has been completed for Standard Oil Co. (Ind.) products terminal at Peoria, Ill. . . . ¶Natural-gas pipe lines, approved and pending, totaled 23,683 miles as of May 15. . . . Would cost more than $1,418,000,000. . . .

INTERNATIONAL—Sinclair starts exploration of its Ethiopian concession. . . . Encounters primitive transport and living conditions. . . . ¶Arabian offshore drilling rights questioned. . . . Superior Oil Co. and British syndicate seeking concession already claimed by Aramco. . . . ¶Proposed $30,000,000 loan by The Texas Co. to Petroleos Mexicanos bogged down by dispute over use of funds. . . . ¶New Kuwait figures show big rise in crude output. . . .



Petroleum promotes progress. The oil industry brings many things to many people. It brought Notrees to Texas and now it brings trees to Notrees. As inset photo proves, Notrees is the post office name of the town which has grown up around the new gasoline plant (large photo) of Shell Oil Co., Inc., on the flat West Texas prairie 20 miles west of Odessa. The plant has a capacity of 45,000,000 cu. ft. daily and serves TXL and Wheeler fields. This week Shell began planting trees in front of employes' homes, belying the town's name.

Price, Not Supply, Seen As Chief Problem of Military in Oil Bids

WASHINGTON.—Current military oil requirements for the remainder of the current quarter are fully covered with the exception of motor gasoline, and those requirements could be filled if the Government would pay the price quoted by suppliers, the House interstate commerce committee was told July 28 by officials of the Armed Services Petroleum Board.

Offers of gasoline at about 5 cents a gallon above the 8½ to 9 cents at which the Armed Services Petroleum Procurement Agency filled most of its requirements are being discussed and Rear Adm. Edwin Foster, chairman of the agency, expressed the hope a satisfactory price could be reached.

Presently scheduled requirements for the remainder of 1948 average 317,000 bbl. daily, of which approximately 59,000 bbl. is for civilian use in occupied areas, Foster said. Currently, military requirements amount to 3.94 per cent of the domestic crude production, or about the same as last year, calling for 0.9 per cent of the motor gasoline available in the United States, 50 per cent of the aviation gasoline, 100 per cent of the jet fuel, 0.7 per cent of kerosine, 0.9 per cent of diesel oil, and 5 per cent of Navy special fuel oil.

However, Foster said, no detailed information is available as yet as to the result of expansion of our military forces on oil requirements, but it is not believed that any direct military increases will affect the civilian situation next winter.

Navy Using Coal

Speaking for their respective branches of the service, Foster and Col. W. G. Vogel of the ASPB told the committee that the effort started last year to limit installations of oil-burning equipment at shore stations where coal can be used has been effective, although lack of funds has precluded any large-scale attempt to convert existing installations at Navy facilities other than at Norfolk and Portsmouth, Va., and Quonsett Point, R. I.

Questioned by members of the committee as to whether oil loaned to states and companies last winter to avert hardships had been returned, Foster reported that 1,050,000 bbl. had been loaned of which all but 3,500 bbl. has now been repaid. The unpaid oil is due from two companies which have had difficulty in getting supplies, he said, but it is expected to come back to the Navy in the near future.

All of the major companies are participating in the military business, but the proportion of the burden varies among them, and suggestions have been made that a more satisfactory arrangement would be a pool to which each company would contribute a certain percentage, thus spreading the burden equitably, it was disclosed by Com. Carl Dresher, executive officer of the board. However, he said, the companies fear to attempt such an arrangement because of the antitrust laws.

Dresher emphasized that the present method of procurement imposes a heavy burden on some companies, making it difficult to cover requirements as they are increased, and Foster interjected that at times it was necessary really to get tough with the industry although, he said, on the whole, relations are quite amicable.

Committee Chairman Charles A. Wolverton told the military experts he had a number of questions relating to the Arabian situation and the extent to which the possibilities of larger supplies from Western Hemisphere sources had been explored, as well as the Navy's emergency tanker program and other matters which might relate to national security, but would withhold them for an executive session which followed the open hearing.

Capt. Ralph Wilson explained that the current tanker situation is all right and will continue so over the next few years provided there are no losses of tankers and that tankers now under contract are completed as programmed, but pointed out that neither of those assumptions is likely to hold true. Some losses are inevitable, he said, and the steel shortage makes it more than probable that construction will be delayed.

The Navy is also short of storage facilities and will ask Congress next year for funds with which to build up to a point where both the strategic reserves and the supplies needed for day-to-day operation can be comfortably accommodated, the committee was told.

The hearing closed with a blast by Wolverton on gasoline prices which, he said, are fixed in "some mysterious manner," apparently regardless of the antitrust laws. He cannot understand, he declared, why all stations in a neighborhood quote exactly the same price, which he said certainly does not indicate there is any competition between the companies.

Superior Oil Co. Moving Ahead With Plans for Offshore Drilling in Gulf

HOUSTON.—Superior Oil Co. of California is moving ahead with plans for further operations in the Gulf of Mexico following its discovery of condensate production 19 miles off Vermilion Parish, Louisiana, several weeks ago.

A second well from the discovery platform is now below 4,500 ft. The discovery well itself, Superior's A-1 Gulf of Mexico State Lease 884, Block 71, is closed in due to lack of market facilities and pending the determination of more data on the reservoir.

Another platform is being fabricated by Avondale Marine Ways in New Orleans, and still another structure is planned for construction in the near future. These are to be located on Superior leases in the Cameron area. The structures are basically like the one from which the Block 71 discovery was made.

Superior and Tidelands Oil Corp. also are preparing for a joint offshore drilling operation in an area central to a point about 3½ miles off shore and 22 miles east of Port O'Connor, Calhoun County, Texas. Tidelands will drill the well.

The Block 71 condensate discovery in Louisiana was the second production to result from the current offshore drilling activity in the Gulf of Mexico. Oil production was obtained by Kerr-McGee Oil Industries, Inc., Block 32 well of Terrebonne Parish last November. The second well being drilled by Superior from the Block 71 platform is a directional hole and will bottom about 2,000 ft. northeast of the discovery. It is expected to reach total depth in about 30 to 40 days. The discovery had production showing 65 bbl. daily with 7,024,000 cu. ft. of gas, through perforations from 9,608-18 ft.

Superior originally drilled the Block 71 well last year, abandoning it in December. The discovery was made from a hole which the company reworked in June. When the well will be produced will be determined by a study of various considerations, including not only reservoir conditions but also the problem of transporting the production to outlets on land.

Stanolind Plans Big Laboratory For Production, Synthesis Work

ONE of the world's largest petroleum laboratories will be erected in Tulsa next year by Stanolind Oil & Gas Co. and will be devoted entirely to research on problems of exploration, production, and natural-gas processing.

The company has purchased a 60-acre site and architects are now drawing plans for facilities to accomodate approximately 600 workers. The main laboratory building will probably be three stories high and have 140,000 sq. ft. of floor space and there will be numerous auxiliary buildings, warehouses, work shops, a library, an auditorium, a cafeteria, and several pilot plants. The new center is expected to be ready for use early in 1950.

Stanolind already has a large laboratory in Tulsa, covering 23 acres and employing about 500 people, and this will be retained and used chiefly for the manufacture of geophysical equipment and for testing and analytical work.

Research at the new center will be of three kinds. The exploration section will study geophysical and other methods of locating oil and will design instruments and equipment for this work. The production section will experiment with new drilling methods and equipment, drilling muds, methods of acidizing and cementing, and will make evaluation studies of reservoir mechanics.

A processing section will work exclusively on methods of synthesizing products from natural gas. The company's Stanosyn plant now under construction at Garden City, Kans., was largely designed in the present Tulsa laboratory, and the new one will work on processing problems and methods for refining the complicated chemical products of gas synthesis. No refining research will be conducted by Stanolind, but the parent company, Standard Oil Co. (Ind.), recently dedicated a huge refining laboratory at Whiting, Ind.

Pilot plants at the new research center will include derricks and drilling rigs in addition to experimental units for processing chemical products of natural gas.

Stanolind claims already to have one of the largest and most complete research organizations in the oil-producing industry. George Roberts, Jr., is manager of the research department. Exploration research is under the direction of Daniel Silverman, J. B. Clark is in charge of research on production of oil and gas, Scott W. Walker directs the chemical process research, and Paul F. Hawley is in charge of patent work.

Tide Water Will Build Houdry Unit at Drumright

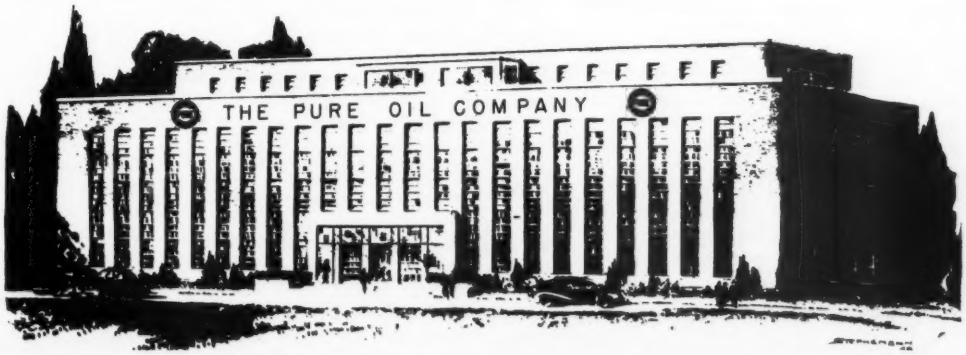
Tide Water Associated Oil Co. has contracted for installation of a Houdry Thermofor catalytic cracking (T.C.C.) unit at its refinery at Drumright, Okla. Construction will begin as soon as materials are available.

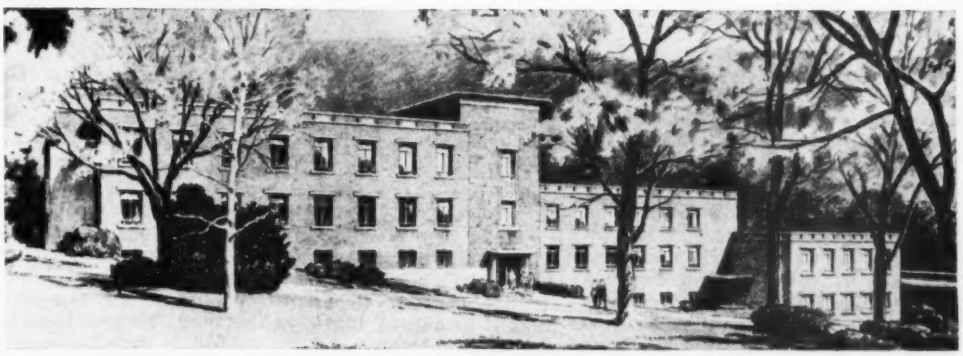
Signing of contracts with Houdry Process Corp., Philadelphia, as licensor, and with Process Engineers, Inc., Dallas, as contractors, was announced by E. H. Salrin, vice president of Tide Water's Mid-Continent division.

The new T. C. C. unit will be designed to charge 4,500 bbl. per day, with additional capacity up to 6,750 bbl. per day for recycling. One of the plant's important design features is its ability to handle either Oklahoma gas oils or high-sulfur West Texas gas oils as charge stocks. The plant will be constructed of new materials and the construction contracts include a gas-recovery plant and auxiliary facilities.

Pressure Maintenance Asked

AUSTIN.—A hearing has been set for August 13 by the Texas Railroad Commission to consider the application of General Crude Oil Co. to conduct pressure-maintenance operations in the Middle Yegua reservoir in Kirby field, Liberty County. The company proposes to inject gas through one or two wells into the gas cap of the Middle Yegua sand reservoir between about 6,000 and 7,900 ft.





Stanolind is only one of several oil companies recently announcing plans for additional research facilities. Pictured here are architects' sketches of two other laboratories now under way. Top: Building for Pure Oil Co.'s new research center at Crystal Lake, Ill. Bottom: One of three buildings being added to the laboratory facilities of The Texas Co. at Beacon, N. Y.

WORLD-WIDE OIL DEVELOPMENTS

Arabian Offshore Drilling Rights May Be Subject of Controversy

AN argument over the ownership of offshore oil rights in the Persian Gulf appears to be brewing in the attempt of Superior Oil Co. to secure from King Ibn Saud a concession to drill off the Arabian coast.

Arabian American Oil Co. maintains that its concession includes the Arabian part of Persian Gulf waters, despite Superior's contention to the contrary. In the past King Ibn Saud has always sided with Aramco, but it is understood Superior is playing on the Palestine partition issue by suggesting that it may join forces with a British company to develop the offshore area, since Great Britain is more sympathetic to the Arab cause of this controversy than is the United States.

The British concern which might become involved with Superior is reported to be the Central Mining Syndicate, which has a controlling interest in Trinidad Leaseholds, Ltd., North Venezuelan Petroleum Co., Ltd., and British Bahamian Oil Development, Ltd. It is headed by Sir Hugh Weightman, and is said to be actively seeking a concession to Saudi Arabian waters.

Kuwait Details Learned

The new concession obtained from the Sheik of Kuwait by American Independent Oil Co., however, explicitly covers adjacent waters as well as the land area of Kuwait Neutral Zone, and runs for 60 years, according to further details of the concession terms which have just been revealed.

The A.I.O. company is currently negotiating with Aramco for a joint development plan, since Aramco has the oil rights to Ibn Saud's undivided half interest in the Neutral Zone. As the Sheik of Kuwait will receive a royalty of $2.50 per ton, or about 35 cents per barrel, Aramco will have to make a separate royalty agreement with Ibn Saud. It must also be decided which of the two companies will do the actual operating in the Neutral Zone. American Independent is anxious to do the work as it is composed of several well-established oil companies who have experienced personnel available.

Experts Will Appraise De Mares for Colombia

W. L. Nelson, professor of refinery engineering at Tulsa University, left this week for Colombia to conduct an appraisal of the De Mares concession plants for the Ministry of Petroleum. The Barranca refinery and natural-gasoline plants at De Mares will revert to the government in 1951. The Ministry has also employed geologists D. Donoghue of Fort Worth and Prof. George Fancher of University of Texas to report on reserves and ultimate production at De Mares.

New Figures Show Kuwait Output Rising Rapidly

Crude-oil production in Kuwait climbed to 453,377 tons, or approximately 111,829 bbl. daily, during June. This compares with the May output of 421,086 tons, or about 100,514 bbl. daily.

In releasing these official figures, Kuwait Oil Co., Ltd., stated that total production for the first 6 months of this year amounted to 2,031,134 tons, or around 83,035 bbl. daily. Production for the first 5 months was 1,577,757 tons, or 78,360 bbl. daily.

Until recently Kuwait Oil Co. has not released exact figures of its production on a current basis, and statistics of output in that country were largely estimates based on reports several months old.

Texaco Loan to Pemex May Not Go Through

OFFICIALS of The Texas Co. in New York refused comment this week on the report from Mexico City that the proposed loan of $30,000,000 to Petroleos Mexicanos had struck a snag.

Intention to negotiate the loan was announced by Texaco last April. It is believed a hitch developed over the desire of Pemex to use the funds for purposes other than those originally proposed. A statement issued by Pemex said:

"Since the end of 1947 Pemex has been negotiating a sales contract with The Texas Co. for a $30,000,000 advance to finance: (1) construction of a plant to manufacture lubricants; (2) construction of a refinery; (3) construction of a pipe line across the Isthmus of Tehuantepec; and (4) purchase of a tanker.

Plans Are Changed

"In the meantime, Pemex finds itself in a position of being able alone to finance construction of the pipe line and considers it no longer necessary to purchase a tanker.

"Pemex's present plan is to (1) construct the lubricants plant; (2) build the refinery; and (3) use the balance of the foreign money originally destined for the pipe line and tanker for the purchase of drilling equipment and pipe which are necessary to increase the volume of petroleum for export.

"These changes, which recently have delayed negotiations with The Texas Co., are necessary under present conditions.

"It should be noted that had the contract been agreed upon it would have gone into effect on January 1, 1949, both as to oil delivered and funds received.

"Since the changes asked by Pemex are justified and since there are several months before the contract can go into effect, there still is a possibility that The Texas Co. will see our point of view and that the contract may be closed in accordance with the present interests of Pemex."

Sinclair Meets Transport Problems in Exploring Its Ethiopian Concession

by Hall Taylor

International
WORLD-WIDE OIL DEVELOPMENTS

The geography, geology, and working conditions in Ethiopia, where Sinclair Petroleum Co. is now exploring its concession, are here described by a geologist who has just returned from a tour of duty with the company.

Hall Taylor graduated from University of Kansas with a major in geology, did graduate work in geology at Northwestern University and Columbia University, and then spent 3½ years in the Army overseas in the Pacific. In 1946 he returned to Columbia University to teach but for the past year he has been on leave to conduct geological studies for Sinclair in Ethiopia. He is now assistant professor of geology at Columbia. This is the first of two articles on Ethiopia.

IN the world-wide search for oil undertaken by American companies following the end of open hostilities in World War II, Sinclair Petroleum Co. secured from Haile Selasse, emperor of Ethiopia, a concession to explore for petroleum throughout his kingdom.

Subsequently, during 1947, American geological and drilling personnel, as well as equipment, were assembled and dispatched to Ethiopia. In addition, three of the company geologists went to Italy and spent several weeks reviewing prewar information on East Africa gathered by geologists of Azienda Generale Italiana Petroli, an Italian state-controlled oil company which had explored East Africa extensively in the 1930's when Italy's star was ascendant in that part of the world.

The Sinclair company established its headquarters, under the direction of R. J. Bender, in Addis Ababa, capital of the country. A field headquarters, headed by Walter Wells, was located in Dire Dawa, capital of the Harrar district, about 200 miles to the east. From this base, geological field parties pushed into the hinterlands, establishing auxiliary camps for work in local areas.

Ethiopia covers some 350,000 sq. miles, an area about equal to that of Texas and Oklahoma combined, or more than double that of California. It lies in eastern Africa, a few degrees north of the equator, and is a region of varied topographic relief and geologic structure. In a "Physiographic Diagram of Africa" Prof. A. K. Lobeck, geomorphologist of Columbia University, has divided the country into three major subdivisions (see map on next page).

Many Deep Gorges

On the northwest is the Ethiopian massive, covering nearly half of the country. This is a region of high volcanic mountain peaks, rain-drenched in summer and partially snowcapped in winter. Extensive Tertiary lava flows here cover many of the underlying crystalline and sedimentary rocks. Deep gorges, carved by roaring mountain streams, form effective barriers to transportation, except by air. In the walls of these gorges, beneath the Cenozoic lavas, there are exposed varying thicknesses of sandy and calcareous Mesozoic sediments, principally of Triassic and Jurassic age. Lake Tana, lying in a tectonic basin in the central part of this region, is the source of the Blue Nile, largest of several rivers which drain the area and unite in the Sudan to the west to form the great Nile itself.

Southeast of the Ethiopian massive and running transversely in a northeast-southwest direction across Ethiopia is the Abyssinian graben, second of the three major subdivisions of the country. This is part of the great East African rift valley which extends more than 4,000 miles from the Zambesi River in Rhodesia on the south to the Jordan River in Palestine on the north. In southwestern Ethiopia near Lakes Chamo and Abaya, this trough is less than 50 miles wide, but to the northeast it gradually broadens and merges with the Red Sea and Gulf of Aden depressions. Its somewhat precipitous walls and numerous hot springs and fumaroles attest to the comparatively recent tectonic and volcanic activity occurring in the area. Much of the valley floor is covered to unknown depths with lava flows, but extensive fracturing and faulting of the earth's crust has resulted in preservation of local areas of sedimentary rocks. Addis Ababa, the country's present capital which was established by King Menelek in 1892, lies near the edge of this graben in central Ethiopia.

The Somali plateau, which comprises the third major physiographic division of Ethiopia, covers the southeastern portion of the country. It extends from the irregularly faulted edge of the Abyssinian graben, where elevations of 6,000 and more feet are common, southeast into the Ogaden, a dry, sandy, brush-covered desert district between 1,000 and 2,000 ft. above sea level. The transition from highland to desert is gradual. Near the edge of the graben the upland is extensively dissected through faulting and stream erosion; the climate is cool and moist much of the year; vegetation grows luxuriantly; and many inhabitants depend on agricultural pursuits for a livelihood. Toward the southeast the general upland level gradually becomes lower, though for some distance the country continues to exhibit extensive dissection resulting from stream erosion; the climate is warmer and drier; vegetation is less extensive; and the natives become more and more nomadic.

Outcrops Are Limited

Streams flowing southeast from the uplands gradually decrease in size through evaporation. Only two rivers, the Juba and Scebeli, receive enough water to carry them across the Ogaden desert, and they disappear in the shifting sands which border the Indian Ocean coast. In the Ogaden the country is flat or very gently rolling, and broken in only a few places by steep-walled gullies carrying intermittent streams. Gravel, sand, and soil effectively conceal most of the underlying strata from surficial geologic study, but limited outcrops indicate the plateau consists of several thousand feet of alternating limestones, sands, shales, and gypsiferous beds, chiefly of Jurassic and Cretaceous age, dipping gently southeast toward the Indian Ocean. In places lava flows, probably of Pliocene or Pleistocene age, cover the ground surface.

Access to this distant land of plateaus and mountains is easiest and quickest by air, though surface trans-

portation is used for most heavy freight.

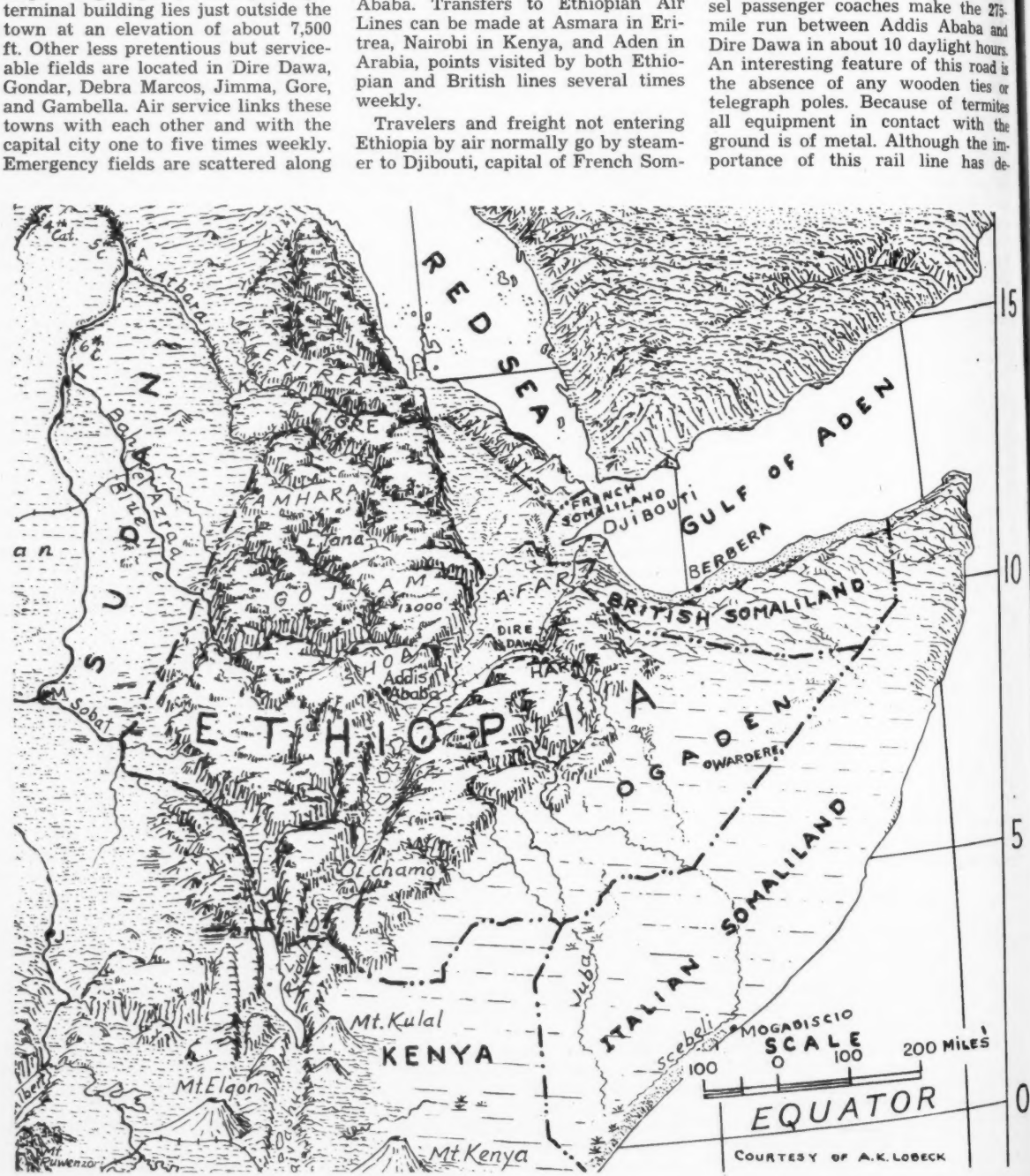
During the war the Allies constructed several airfields in Ethiopia, just as in other parts of Africa, and also improved fields previously built by the Italians. At Addis Ababa an excellent field with surfaced runways, ample hangar space, and a passenger terminal building lies just outside the town at an elevation of about 7,500 ft. Other less pretentious but serviceable fields are located in Dire Dawa, Gondar, Debra Marcos, Jimma, Gore, and Gambella. Air service links these towns with each other and with the capital city one to five times weekly. Emergency fields are scattered along the routes most frequently flown.

Entrance to the country by air from the United States is best via T.W.A. from New York to Cairo, and via Ethiopian Air Lines from Cairo to Addis Ababa. Sinclair personnel make the entire trip, when favored with good connections, in 3 to 4 days. Ethiopian Air Lines uses American DC-3's, flown by American pilots. Hostesses are multilingual girls capable of understanding almost any language.

British Overseas Airways also provides service to this part of the world, though not regularly going to Addis Ababa. Transfers to Ethiopian Air Lines can be made at Asmara in Eritrea, Nairobi in Kenya, and Aden in Arabia, points visited by both Ethiopian and British lines several times weekly.

Travelers and freight not entering Ethiopia by air normally go by steamer to Djibouti, capital of French Somaliland on the Red Sea coast. From there they move inland via the only railroad which enters Ethiopia, a narrow-gage line controlled by French capital. From Djibouti on the coast it extends nearly 200 miles southwest to Dire Dawa in eastern Ethiopia, then runs some 275 miles farther inland to Addis Ababa, western terminus of the line.

Combination freight and passenger trains make three or four slow trips a week each way over the line, traveling only during daytime. About twice a week comparatively fast diesel passenger coaches make the 275-mile run between Addis Ababa and Dire Dawa in about 10 daylight hours. An interesting feature of this road is the absence of any wooden ties or telegraph poles. Because of termites all equipment in contact with the ground is of metal. Although the importance of this rail line has de-



Physiographic diagram of a portion of eastern Africa by A. K. Lobeck, showing the three major physiographic divisions of Ethiopia

creased somewhat in recent years with the advent of heavy trucks and airplanes, it is still the means by which most heavy equipment reaches the interior of the country.

Land travel in Ethiopia is influenced greatly by topography. Where the land is flat or but little dissected, roads are usually satisfactory; elsewhere the most reliable means of access may be by foot, or by horse or mule back. Roads passable to vehicles in good condition connect Addis Ababa with Asmara to the north, with Djibouti to the east and with Nairobi to the south. Less well-maintained roads radiate outward from Addis Ababa to the various provinces. During the rainy season vehicles with four-wheel drive have a distinct advantage. Sufficient gasoline and oil for an entire journey must be carried in the vehicle. American-style filling stations are rare outside a few of the larger towns.

Units Self-Contained

In preparing to enter Ethiopia for exploratory work Sinclair Petroleum Co. assembled in the United States not only the necessary geological, engineering, and drilling equipment, but also such items as food supplies, tents, and prefabricated housing material. This was shipped to Djibouti, then moved by rail to Dire Dawa where it was stored until needed in a large warehouse leased for the purpose. Thus the company parties were largely self-contained units when entering the field, and were not dependant upon local supplies for food, shelter, or other items.

The company surveyed an alternate route of entry, in which Mogadiscio, former capital of Italian Somaliland now administered by the British Colonian Service, would have been the seaport. Supplies would then have been trucked into the Ogaden over prewar Italian-built roads. This route has the advantage of being more than 100 miles shorter than that via Djibouti and Dire Dawa. Furthermore, the first 200 miles of road north of Mogadiscio is all-weather hard-surfaced asphalt. One considerable disadvantage is the lack of deep water at the small Mogadiscio docks. All freight must be transshipped behind a small breakwater from ocean vessels to lighters which bring it to shore. This is a precarious undertaking with heavy oil-field equipment, and the route has not yet been used.

Auto Travel Difficult

Prior to entering Ethiopia enough was known of the geology to indicate that the thickest sedimentary section in the country lay in the Ogaden region to the southeast of Dire Dawa. For this reason most geological exploration was concentrated in that area.

A geological party entered this region in August 1947. The personnel traveled by jeep, and their supplies came by Italian-built "trenta-quattro" trucks, chartered from a trader in Dire Dawa. Diesel vehicles of this type, common in this part of Africa, are now more than 10 years old, but somehow are kept moving by their Italian driver-mechanics, who work despite continuing wartime shortages of replacement parts from Italy. As soon as Sinclair's American-built Ford, Dodge, and Mack trucks arrived in Dire Dawa they were placed in service, and provided much faster and more dependable transportation than the Italian vehicles.

The country is flat, sandy, brush-covered desert, and a jeep proved ideal for traversing roads, but not so satisfactory for going through brush, because of the excessive number of flat tires caused by spines from the ubiquitous thorn brush. Puncture-proof tubes might have solved this difficulty, but none were available. The Dodge Power Wagon, with its larger, heavier, tire casings developed far fewer flats, and in addition was able to carry enough equipment and supplies, including gasoline, for a 15-day, 1,500-mile, safari. Its four-wheel drive permitted the crossing of sandy "tugs" with ease, and its winch gave an added safety margin. It was a very useful general-purpose vehicle.

Rainfall in the Ogaden averages about 10 or 15 in. a year, and comes principally during April, May, October, and November. The sandy, porous, soil permits quick runoff from the slopes, but in many depressions a rather impervious "hardpan" causes formation of lakes, which eventually disappear through evaporation.

During the rainy season travel is uncertain. Tugs, dry most of the year, may suddenly fill with swirling streams which are impassable. Roads become soft, and even develop quagmires in low spots. But conditions of impassability normally do not prevail for more than a few days at any one time. Soft sand, churned by the wheels of passing trucks, proved a more formidable obstacle than did rain-soaked roads.

International

WORLD-WIDE OIL DEVELOPMENTS

Air Transport Used

In such an area which is very dry much of the year, the water problem becomes acute. Native tribes will fight each other to the death for rights at good water holes, and will resent encroachment by the white man. In the Ogaden, water used by the company was secured either at the British-controlled wells in Wardere, or was trucked nearly 200 miles from the Scebeli River. Nothing is known of ground-water resources in the region, but some water holes reportedly never go dry, and it seems likely that drilling will reveal aquifers within one or two hundred feet of the surface.

Communication between the base camp in Dire Dawa and field camps in the Ogaden required either a motor or plane trip of more than 300 miles, or a circuitous radio relay of some 1,500 miles via Addis Ababa and Mogadiscio.

A four-passenger Stinson plane, which arrived in November 1947, was assembled and subsequently piloted by Tony Hunter, long a Sinclair stateside pilot. A small wartime field at Wardere was used as the Ogaden airport, making possible communication with Dire Dawa in 2 hours instead of 2 days as previously required. The plane was used principally by Walter Wells, drilling superintendent, but was also used a few times by Taylor, acting chief geologist, to survey wide areas largely inaccessible by vehicle. It permitted rejection for surface geologic work of areas which proved to be only thornbush-covered sand, and also permitted quick surveys of areas which seemed to merit further ground study.

Note: In a second article, Dr. Taylor will discuss Ethiopian geology and the possibilities for occurrence of oil in that part of Africa.

Tony Hunter, pilot, R. J. Bender, manager, and an Ethiopian office man in front of Sinclair's office in Addis Ababa

WASHINGTON WATCHING

BY BERTRAM F. LINZ

To Stop Monopoly

WASHINGTON. — The Department of Justice is preparing to step up its campaign to wipe out price fixing and monopoly.

Three new field offices are to be opened by the antitrust division and the forces at the eight present offices strengthened. Division attorneys will make periodic surveys of the various industrial areas to uncover illegal price fixing and other restraints of trade and violations of the antitrust laws, and each field office is to assign personnel to assist small businessmen to secure "full opportunity and free competition."

Department officials haven't said that the oil industry will be one of the targets of the accelerated drive, but oil and movies have for years been the outstanding objectives of antitrust attacks. And the three new field offices will be in areas from which many complaints against oil distributors have come from independent dealers—Philadelphia, Jacksonville, and Kansas City.

"Continuing high prices and the growth of private economic power" compel a nation-wide antitrust survey, Atty. Gen. Tom C. Clark said in discussing the program.

Asst. Atty. Gen. Herbert A. Bergson, head of the antitrust division, went even further, inviting everyone with a grievance to bring it to the attention of the department.

"Some of the best leads the antitrust division has had in uncovering and prosecuting antitrust cases have come from complaints sent in by individuals," said Bergson.

It may, of course, have been purely coincidental, but the department's disclosure of plans to do something about high prices came less than 48 hours after President Truman appealed to the "do-nothing" Eightieth Congress to do something about them and on the heels of intimations by Republican leaders that they weren't going to.

Joe Has a Plan

SEN. JOSEPH C. O'MAHONEY of Wyoming, avowed foe of oil and other trusts, has come up with a new approach to the problem of pricing by applying public-utility regulation to corporations proposing price increases.

O'Mahoney says his plan provides for a "cooling period" between the time a price increase is announced and the date it becomes effective, similar to the delay on strikes provided for in the Taft-Hartley Act. But legislation he has prepared shows it to be something more than just that.

Any corporation in any industry producing an essential commodity where 30 per cent or more of the output is produced by five or fewer producers would be required to file notice of intention to increase prices with the secretary of commerce, the attorney general, and the Federal Trade Commission, and within 30 days the FTC would call a public hearing at which the corporation would have to show the reason for and justify the proposed advance in prices.

Both the secretary of commerce and the attorney general could examine the corporation, and the public could give testimony for or against the price increase. All of the corporation's books, papers, and documents, and such witnesses as the commission desired to hear, could be subpenaed, and the FTC could have a swell time figuring whether the X Oil Co. was justified in making a tenth-of-a-cent increase in gasoline prices.

And when it was all over, the secretary of commerce, the attorney general, and the Trade Commission would make a joint report to Congress, with joint or separate recommendations for additional action. Somewhere along the line, though, the price increase appears to have been lost, for O'Mahoney's bill doesn't say whether, when or how it is to become effective.

Spelled out, O'Mahoney's plan would freeze prices in practically every manufacturing industry, since there are very few in which the five top companies do not account for 30 per cent or more of the output. And it would mean that even the smallest corporation in an industry would have to go through the same rigmarole and maybe starve to death before the FTC gets through its investigation.

O'Mahoney summed it up himself. The bill is designed to stop price increases in basic commodities. It will be effective "because the giant monopolies which control the supply and fix the prices of the commodities 140,000,000 people must buy will be unwilling to subject themselves to crossexamination about their pricing policies and their gigantic profits."

"My proposal is simple," the senator said.

So Has FTC

THE Federal Trade Commission warned Congress last week that it must either curb big business or bow to industrial monopoly.

In a report urging the tightening of the 34-year-old Clayton Antitrust Act, the commission declared it is vital that action be taken to prevent giant corporations from steadily increasing their power at the expense of small business. Since 1940, it said, mergers have resulted in the disappearance of more than 2,450 independent businesses, 40 per cent of them absorbed by corporations with assets between $5,000,000 and $50,000,000 and another 30 per cent by corporations with assets exceeding $50,000,000. A number of these mergers involved concerns engaged in the petroleum industry.

The commission explained that while the Clayton Act curbs the acquisition by corporations of the stock of competing firms, a loophole permits the purchase of assets and thereby nullifies the original intent of Congress to check the creation of of monopolies in their early stages. Legislation to deal with this situation has been pending in Congress since 1945.

"If nothing is done to check the growth in concentration, either the giant corporations will ultimately take over the country, or the Government will be impelled to step in and impose some form of direct regulation," the commission declared.

"In either event, collectivism will have triumphed over free enterprise, and the theory of competition will have been relegated to the limbo of well-intentioned but ineffective ideals."

Tidelands Ebb

NO action toward settling the controversy between the Government and the state of California over the boundaries of the tidelands areas which the Supreme Court said last year belonged to the United States is expected before the court convenes in October for its 1948-49 term.

Meanwhile, however, retired Justice D. Lawrence Groner, appointed by the court in June as special master to take evidence in the matter, has suggested that Department of Justice and state officials confer next month with a view to developing such facts as they can agree on before any extensive hearings are held on the West Coast.

Threat to Stripper Wells Seen In Truman Antiinflation Plan

WASHINGTON. — President Truman's antiinflation program was spelled out for Congress last week by Paul A. Porter, former chief of the Office of Price Administration.

But the "new" control program outlined by Porter, now an assistant to the President, turned out to be the same as that sought by Mr. Truman last year—price, wage, inventory, and allocation controls over scarce commodities, regulation of bank credit, strengthened rent control, etc.

Laying the President's principles before the House banking committee July 29, Porter found himself almost immediately in rough water. He said the administration wanted power to set prices so far as practicable at the November 1947 level; but he indicated that such authority would not reduce the present general price level. He gave the impression that it was believed by the administration that the mere granting of the requested authority would halt the inflationary spiral.

Under insistent and frequently sharp questioning, Porter refused to specify the items that would be controlled and finally was asked by Chairman Jesse P. Wolcott of Michigan whether he thought Congress would give the President "carte blanche authority without details on how he is going to use the controls?"

Could Freeze Prices

The administration bill which Porter supported would permit the imposition of price ceilings on any commodity important to the cost of living or to industrial production on which the price has risen or threatens to rise at least 20 per cent above the June 1946 level, where regulation of the price is practicable and enforcable and the public interest will be served by such regulation.

Price ceilings so set must be "generally fair and reasonable" and must take into consideration speculative fluctuations, changes in costs and profits, and other relevant factors since November 1947. Prices could be temporarily frozen pending industry consultation, hearings, and review of price-fixing orders.

Oil men saw in the administration program a recurrence of the threat to stripper-well operations raised by the wartime price controls, particularly in the absence of any provision for government subsidies such as were adopted during the war to prevent the loss of marginal production.

Committee members were openly skeptical of the administration's plan of action, with Wolcott telling Porter that "you almost wrecked the economy of the country the last time we had controls," while the former price chief protested there was no intention of putting in as broad a program as OPA had.

There appears to be little likelihood that the committee will approve a program of "standby" authorities which would permit the administration to tinker with the whole economy and few members, among the Republicans at least, believe the President could withstand the pressure which would be exerted upon him to find an "emergency" necessitating their application.

Date of Next Oil Show May Be Fixed This Week

THE date and duration of the next International Petroleum Exposition in Tulsa was scheduled to be determined by a meeting of the executive committee of the board of directors this week.

At the time of the I.P.E. last May many exhibitors expressed a desire to hold the oil show less often than every 2 years as was the custom before the war, but to extend it longer than the usual 8 days.

The Petroleum Equipment Suppliers Association, whose members accounted for about 40 per cent of the total exhibition space this year, favors holding the next show in 1952. A poll of 602 suppliers brought 410 replies, of which 78 per cent favored a 4-year interval, 10 per cent a 3-year interval, and 12 per cent a 2-year interval.

On the other hand, a poll of executives of oil companies in all branches of the industry conducted by the I.P.E. directors brought more than 400 replies of which 43 per cent favored the next exposition in 1950, 32 per cent in 1951, and 25 per cent in 1952. It is understood that considerably more than half of the number of actual exhibitors this year are opposed to a 4-year interval and favor holding the next show either in 1950 of 1951.

In view of these varied opinions, therefore, observers believe that the most satisfactory compromise probably would be a 1951 date for the next exposition. There appeared to be rather general support for keeping the next show open for at least 10 days or 2 weeks.

Federal Taxes on Lubes Fall as Others Increase

WASHINGTON. — Treasury revenues from the three federal oil taxes for the fiscal year ended June 30, last, topped $579,000,000, exceeding those of the preceding year by some $45,000,000, it was reported by the Internal Revenue Bureau July 30.

Receipts of $478,637,625 from the tax on gasoline ran $44,961,757 above the 1947 figure, while the $18,773,056 from pipe-line transportation showed a gain of $1,784,879, the bureau announced. Collections from lubricating oils were $80,886,921 and were $1,127,746 below the previous year.

Current figures indicate that the trend on lubricating oils has been reversed and the upward movement on gasoline and pipe-line transportation continues. For the first half of the calendar year, the return from lubricating oil was $41,911,960 against $39,674,348 for the same period in 1947; gasoline $226,678,010 against $203,390,505, and pipe-line transportation, $9,680,482 against $8,937,398.

Next Week

CONCRETE PIPE for surface casing? . . . Neil Williams of the Journal staff describes this new development, with sequence photos of installations in the first two wells (Oklahoma and Kansas locations).

EVALUATING OIL PROPERTIES? . . . Earl A. Nichols, consulting petroleum engineer, Dallas, in a five-page report outlines the steps in making both the field investigations and the engineering calculations.

HYPERSORPTION PROCESS? . . . what is it? The Journal's refining editor gives both flow diagrams and plant operational data on this new "super" absorption-fractionation operation.

AND

"Circular Salt-Water-Treating Unit in East Texas Proves Highly Successful;" "Flexible Operation Achieved Through Instruments at Roosevelt Oil Co.'s refinery (Mt. Pleasant, Mich.);" "New Jet casing Cutter Saves Time in Signal Hill (Calif.) Casing Cutting Job."

Pacific Coast Supply and Demand Now Balance, With Outlook Good

LOS ANGELES.—A study of recent reports of the U. S. Bureau of Mines verifies the opinion of oil men that petroleum demands on the West Coast can be met through 1948 without shortages.

This does not mean that supplies will be so ample that consumers may be prodigal in their use of gasoline this summer or heating oils next winter. It does mean that with proper restraint to avoid waste and extravagance, there is good assurance that even the currently high level of demands can be met without hardship or rationing.

The production of crude oil in California has now reached 955,000 bbl. per day and is still rising. It is expected to reach 960,000 bbl. per day by the end of the year. Discoveries of primary importance in the Cuyama Valley and at Lost Hills may boost the average still higher. Production in pre-war years was 600,000 to 650,000 bbl. per day, and domestic consumption was able to utilize only about three-fourths of it. Domestic consumption has doubled since then, and still there is sufficient supplies to permit exporting between 5 and 10 per cent of the total to Canada, Hawaii, and other Pacific areas.

The total supply of raw materials and products, including some small imports of lubricating oil and other commodities from the Mid-Continent and Rocky Mountain areas, is running 4 per cent above last year. The total demand, on the other hand, is running only 2 per cent higher, and therefore, stocks are increasing slightly.

Total petroleum stocks on the West Coast at the beginning of this year were around 90,000,000 bbl. By the end of the year they are likely to reach 100,000,000 bbl. At first glance this looks like a comfortable increase, which, of course, it is. Prior to the war, when surplus oil caused excessive stock levels, they reached a peak of 164,000,000 bbl. in 1939. Considering the greatly increased volume of business, a level of 100,000,000 bbl. now is barely comfortable.

Most of the oil being added to inventories is heavy residual fuel of a kind unsuited to home heating. The balance of supply and demand for light fuel, as well as for motor fuel, is a delicate one. While a balance seems reasonably sure at this time, unforeseen developments in the form of military demands on one hand, or large new discoveries of gasoline-bearing crude on the other, might change the outlook in one direction or the other in a matter of months.

Gasoline demands are running 4 to 5 per cent above last year and show some signs of leveling. Early reports on summer automobile traffic indicate that vacation travel so far this year is not much above last year.

Residual fuel demands are 7 to 8 per cent below those of last year. There are two principal reasons for this drop. First, the long-delayed spring rains replenished the storage behind dams where electric power is generated. Second, more natural gas is available this year, both from local supplies and from West Texas.

In summary, the outlook for heavy fuels has eased considerably. The outlook for gasoline and light fuels is close to a balance, with no hardships expected unless unforeseen demands should arise.

The accompanying table, based on Bureau of Mines figures, shows the trend in supply and demand factors so far this year with estimates for the balance of 1948.

THE PETROLEUM SITUATION IN THE PACIFIC COAST TERRITORY—1948 VS. 1947
(Thousands of barrels per day)

TOTAL SUPPLY

	Crude-oil production†			Nat. gasoline and L.P.G. production			Crude and products imports			Total petroleum current supply		
Month—	1947	1948	% Increase	1947	1948	% Increase	1947	1948	% Increase	1947	1948	% Increase
January	885	933	5.42	65	74	13.85	16	10	*37.50	966	1,017	5.28
February	902	936	3.77	66	74	12.12	16	15	*6.25	984	1,025	4.17
March	905	942	4.09	63	74	17.46	20	20	....	988	1,036	4.86
April	908	946	4.19	65	71	9.23	15	13	*13.33	988	1,030	4.25
May	914	949	3.83	66	72	9.09	16	13	*18.75	996	1,034	3.82
June	916	954	4.15	68	72	5.88	12	13	8.33	996	1,039	4.32
July	920	955	3.80	68	72	5.88	13	13	....	1,001	1,040	3.90
August	920	...	....	69	..	....	13	..	....	1,002	....	....
September	917	...	....	70	..	....	14	..	....	1,001	....	....
October	924	...	....	71	..	....	12	..	....	1,007	....	....
November	932	...	....	73	..	....	13	..	....	1,018	....	....
December	929	...	....	74	..	....	12	..	....	1,015	....	....
Jan.-May actual	903	941	4.21	65	73	12.31	17	14	*17.65	984	1,028	4.47
Jan.-June, est.	905	943	4.20	65	73	12.31	16	14	*12.50	986	1,030	4.46
July-Dec. est.	923	957	3.68	71	73	2.82	12	14	16.67	1,008	1,044	3.57
Jan.-Dec. est.	914	950	3.94	68	73	7.35	14	14	....	997	1,037	4.01

TOTAL DEMAND

	Gasoline			Gas oil and diesel oil			Heavy fuel oil			Total petroleum		
Month—	1947	1948	% Increase	1947	1948	% Increase	1947	1948	% Increase	1947	1948	% Increase
January	313	323	3.19	177	162	*8.47	420	368	*12.38	1,035	990	*4.35
February	320	313	*2.19	142	204	43.66	425	394	*7.29	1,012	1,053	4.05
March	304	334	9.87	117	170	45.30	390	390	....	932	1,036	11.15
April	336	357	6.25	125	159	27.20	385	357	*7.27	988	1,000	1.21
May	332	384	15.66	85	123	44.71	357	328	*8.12	912	970	6.36
June	385	382	*.72	91	122	34.07	362	303	*16.30	979	942	*3.78
July	335	388	15.82	88	110	25.00	360	310	*13.89	935	958	2.46
August	370	...	....	100	...	....	362	...	....	985	....	....
September	370	...	....	113	...	....	386	...	....	1,030	....	....
October	356	...	....	139	...	....	376	...	....	1,010	....	....
November	317	...	....	138	...	....	380	..	....	978	....	....
December	349	...	....	173	...	....	441	...	....	1,090	....	....
Jan.-May actual	321	342	6.54	129	163	26.36	395	367	*7.09	975	1,009	3.49
Jan.-June est.	332	349	5.12	123	156	26.83	389	357	*8.23	976	998	2.25
July-Dec. est.	350	363	3.71	125	144	15.20	385	363	*5.71	1,004	1,026	2.19
Jan.-Dec. est.	341	356	4.40	124	150	20.97	387	360	*6.98	990	1,012	2.22

*Indicate minus quantity. 1948 figures for June, July, and year are estimates. †Crude-oil production includes field condensate.

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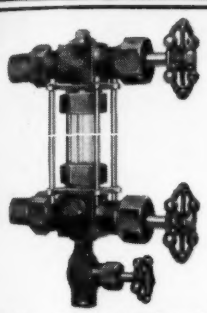

Extra heavy construction throughout. Body made from special high strength alloy iron, shanks alloy steel and trim stainless steel. Automatic and positive shut-off if glass breaks, valves self-cleaning, dripless drain cock permits gradual blowing off of gage. Conforms with A.P.I.-A.S.M.E. requirements.

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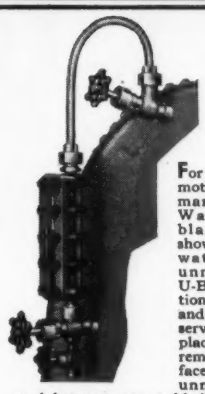

For oil field, locomotive type and marine boilers. Water shows black — steam shows white; the water level is unmistakable. U-Bolt construction is strongest and simplest to service. Glass replaced by simply removing nuts on face of gage . . . unnecessary to work between gage and boiler. Conforms with A.S.M.E., Federal and State requirements when used for pressures specified by their respective codes.

This is one of the complete line of Penberthy gages that meet every liquid level gage requirement.

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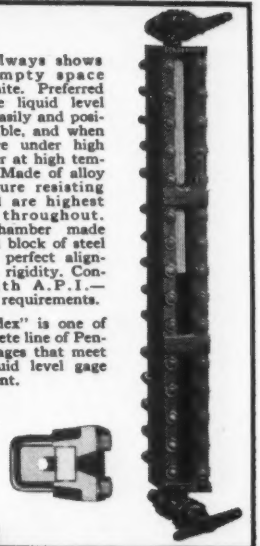
The "Reflex" is one of the complete line of Penberthy Gages that meet every liquid level gage requirement.



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Use the power of steam, air or water under pressure to lift liquids. Being simple jet pumps they have no moving parts and require no lubrication. A variety of models to meet different conditions. Also used as water heaters.

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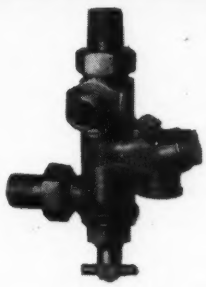

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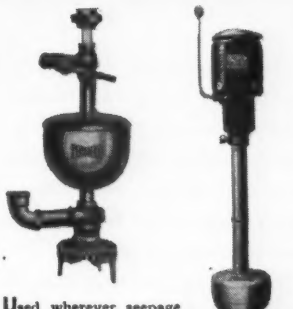
PENBERTHY INJECTOR CO.
DETROIT, MICH. Canadian Plant WINDSOR, ONTARIO

PENBERTHY
SUMP PUMPS



Used wherever seepage water accumulates, the Penberthy Automatic Electric Sump Pump and the Penberthy Automatic Drainer (water or steam operated) have demonstrated their superiority in this service. Simple and rugged design—copper and bronze construction throughout.

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Richfield Opens Cuyama Valley For New California Area

by Herndon David

THIRTEEN active drilling operations and seven locations within a few weeks after their discovery is the record established by Cuyama Valley, California, fields. (See Table 1.) The first significant discoveries in the state in over 10 years, these fields promise to be the first major fields uncovered in that period of time.

Richfield Oil Corp. in the latter part of June, astounded the California oil industry with what appear to be two major discoveries within 5 days. The first of these was the Richfield 28-5 Russell-A, 5-10n-27w. This well came in flowing at the rate of 500 bbl. daily of 38.3°-gravity oil from approximately 250 ft. of oil sand found in the interval 2,970-3,360 ft. Total depth of the well was 4,218 ft.

Hardly had news of this discovery reached the industry when a second announcement from Richfield stated that its 37-30 Anderson Colgrove, 2¼ miles to the northwest in 29-11n-28w, had come in flowing at an estimated rate of 4,000 bbl. daily of 33°-gravity crude from a depth of 3,019 ft. Production from this well subsequently was cut back to 600 bbl. daily. Since that time a second well, 26-30 Anderson-Colgrove, an offset well also in 29-11n-28w, has been completed flowing at the rate of 3,912 bbl. daily on a 3-hour gage from a total depth of 2,970 ft.

Geology of Cuyama Valley

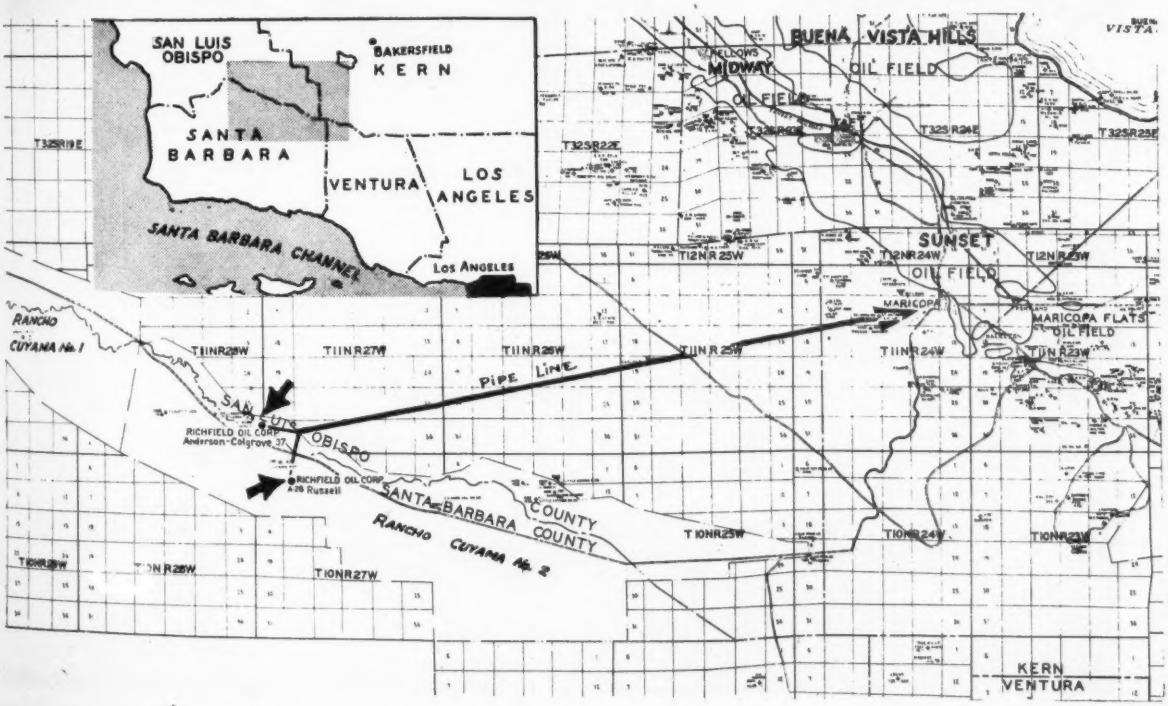
Completion of the discovery wells immediately aroused considerable speculation among California geologists and oil operators as to the producing formations and whether the wells had uncovered a single accumulation or two separate fields. Richfield has since answered the first of these questions by announcing that the producing formation definitely has been determined to be the Vaqueros sand of the Miocene, which was first discovered to be productive in Elwood field in 1928. (Elwood field in the coastal region lies about 30 miles south of Cuyama Valley and was the first field to get production in the Vaqueros sand.)

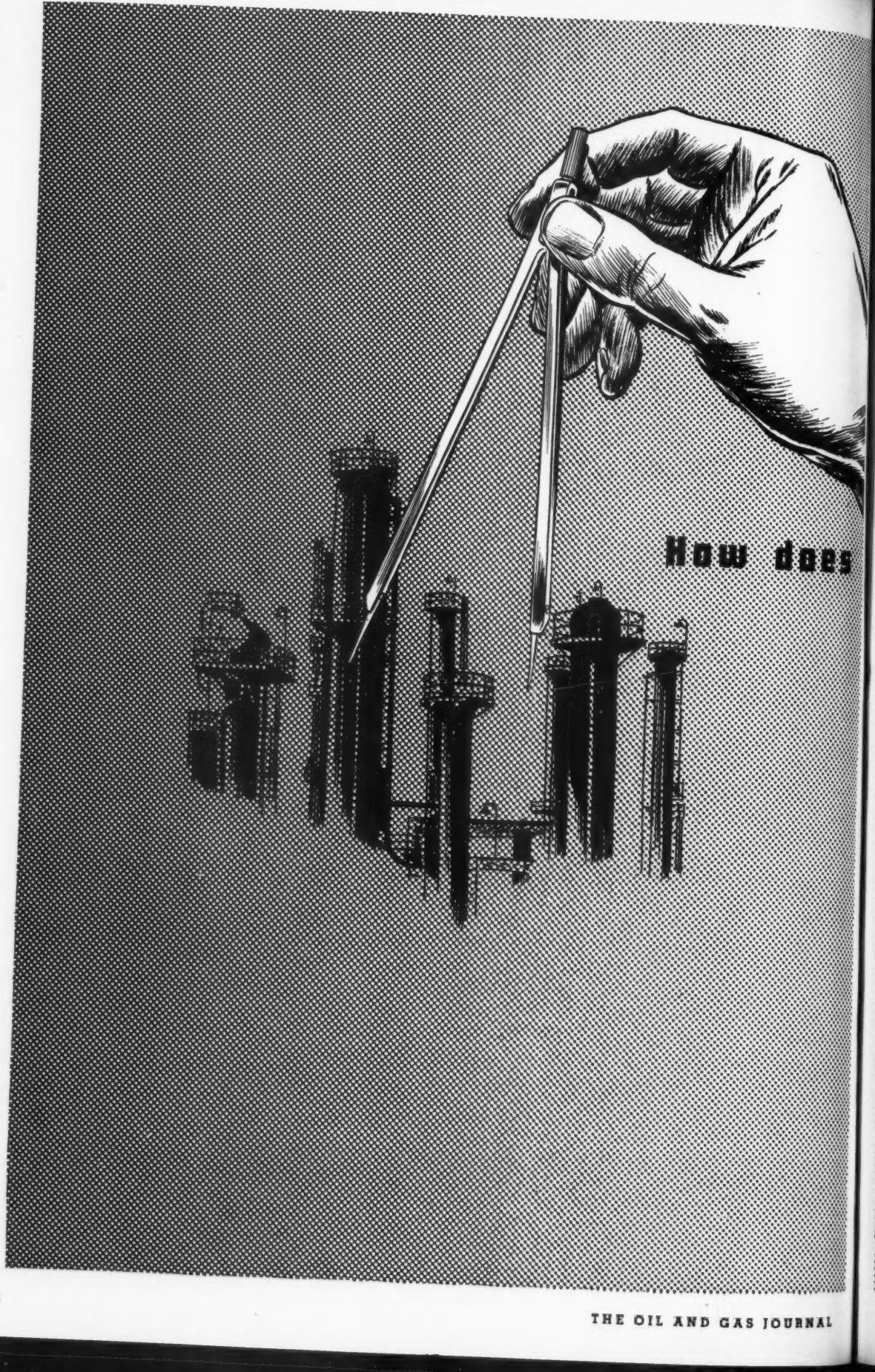
The second question, however, is still unanswered. Richfield, which has spent more than 4 years making a thorough geologic study of the area, states that the question can be answered only by future drilling. Gen-

(Continued on page 142)

Above: Due to the relatively shallow depth, approximately 4,000 ft., of the pay zone in the new Cuyama Valley, California, area, light, portable power rigs are used for the drilling

Below: Map showing portions of the four California counties, Cuyama Valley area, and Richfield Oil Corp.'s discovery wells

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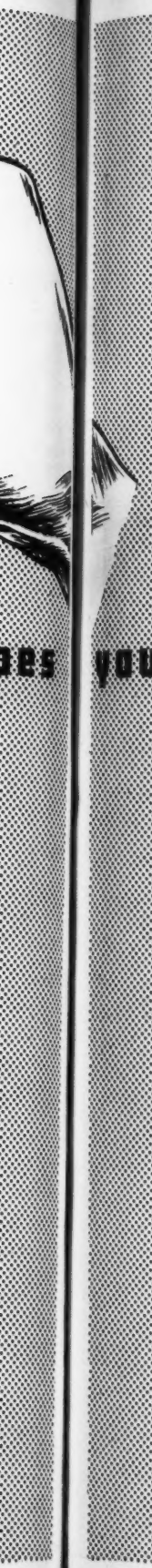

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PERSONALS

Rogerson Has 22 Years In Refining Work for Lion

J. B. ROGERSON, who earlier this year was named manager of manufacturing for Lion Oil Refining Co., El Dorado, Ark., began his career in refining operations when he joined the company in 1926 after leaving the lumber business.

Before his promotion this year Rogerson was general superintendent for Lion. His present position includes direction both of refinery and chemical plant operations for the company.

A native of Smackover, Ark., Rogerson received his formal education in that state, graduating from the University of Arkansas in mechanical engineering after having served in World War I as an officer in the field artillery.

He joined Allis-Chalmers Manufacturing Co., in the pump and turbine division, Milwaukee, Wis., and was employed in this capacity for 2 years, after which he returned to Arkansas to enter the lumber business.

In 1926 Rogerson joined Lion and since that time has served as plant engineer, chief engineer, process superintendent, and general superintendent. His assignments have included design, construction, and operation of the asphalt plant, lubricating-oil plant, and a modern cracking unit.

Victor G. Hill, formerly division geologist for the central division for Stanolind Oil & Gas Co., has been promoted to exploration superintendent for the division. He has been succeeded by **George H. Galloway,** formerly district geologist for the Oklahoma district. Hill, who has been with the company since his graduation from the University of Kansas in 1927, did geological work in Oklahoma and Michigan and served as district geologist at Shawnee and Oklahoma City, before he became division geologist. Both men will continue to be headquartered at Oklahoma City. **H. H. Kister,** who has headed the division's exploration work, has been called to the Tulsa general office for work on a special geological assignment.

J. W. Thompson has been named in charge of the newly opened district office in Oklahoma City for Bay Petroleum Corp., Denver, Colo.

Lt. Col. Charles F. Hardman, USAF, has been ordered to Bartlesville, Okla., headquarters of Cities Service Oil Co. to begin a 12-month tour of training. Cities Service is cooperating with USAF in its program for industrial mobilization training.

H. Wayne Hoylman, formerly with Gulf Research & Development Co., has accepted a position as chief geophysicist for Fairchild Aerial Surveys, Inc., in Los Angeles. Hoylman will specialize in interpretation of aerial magnetic data, having spent 14 of his 18 years with Gulf in special studies of the relation of the earth's magnetic field to geology. He will have field supervision of aerial magnetic surveys of over 100,000 sq. miles in the United States and Canada.

Jack Louis Walper, of Alberta, Canada, who served as chief engineering aide to the U. S. engineers on the Canol project in Canada, and **Raymond H. Swanson,** formerly field geologist for Amerada Petroleum Corp., at Midland, Tex., have been appointed to the factulty of the University of Tulsa as instructors in the geology department.

Dr. Frederick D. Rossini, chief of the thermochemistry and hydrocarbons section of the National Bureau of Standards, recently was awarded an honorary Doctor of Science degree by the Carnegie Institute of Technology. During the war Rossini served as consultant for the technical advisory committee of the Petroleum Industry War Council.

Harry A. Baldwin, formerly associated with a law firm, has been elected vice president of Arrow Petroleum Co., Forest Park, Ill.

John E. Sherborne, associate process engineer and production research engineer for Union Oil Co. of California, Los Angeles, Calif., has been appointed chief production engineer for the company. He has recently been engaged largely in core analysis and secondary-recovery studies. Sherborne, who joined the company in 1936 as a petroleum engineer, has also been active in American Petroleum Institute studies of core analysis and secondary recovery. He will make his headquarters in Whittier, Calif.

Benjamin Brewster, who joined Ethyl Corp. more than 21 years ago as a member of the automotive engineering staff, has been appointed to the newly created position of manager of the technical service division of the company's research laboratories in Detroit, Mich. Brewster will continue as a member of the technical representatives group, which maintains contact between the Ethyl laboratories and the research laboratories of oil companies.

L. F. McCollum, president of Continental Oil Co., Ponca City, Okla., is one of four new members recently named to the board of directors of the American Petroleum Institute. He succeeds the late D. J. Moran. McCollum was also elected to membership of the Institute's Executive Committee to succeed **W. S. Ferguson** of Continental at Denver, Colo., who has resigned. The other three new members are: **J. H. Peper,** Northern Pipe Line Co., New York, to succeed **D. S. Bushnell,** of the same company, resigned; **A. W. Ambrose,** Cities Service Oil Co., Bartlesville, Okla., to succeed **H. R. Straight,** of the same company, resigned; and **Burl S. Watson,** Petroleum Advisers, Inc., New York, to succeed **Harry D. Frueauff,** of the same company, resigned.

J. B. Christian has been appointed to assistant general manager of Trinidad Leaseholds, Ltd., Trinidad, B.W.I., and **H. W. MacNaughton-Jones** has been named manager of the company's refinery division. **Simon J. Vos,** acting managing director of Trinidad Leaseholds and manager of

PERSONALS

Regent Oil Co., Ltd., both of London, has been appointed a director of Central Mining & Investment Corp. of London.

Charles L. Harding, a director of Socony-Vacuum Oil Co., Inc., has been named a director of the Trans-Arabian Pipe Line Co., succeeding **Brewster Jennings,** Socony-Vacuum's president. Jennings retains his directorship with Arabian American Oil Co.

Paul J. Moore, former district engineer for Gulf Oil Corp., in several Texas areas, has resigned to open a petroleum consultant engineering office in the Transit Tower at San Antonio, Tex. He is a graduate petroleum engineer from Texas A. & M. College and prior to his tenure with Gulf served the Humble Oil & Refining Co. near Corpus Christi, Tex.

Tom Rich has been made Sunray Oil Corp. landman at San Antonio, and **J. E. Endicott** has succeeded Rich as the company's scout.

Durward N. Jolley, Corpus Christi, Tex., geologist, is moving to San Antonio where he will become consultant for Henshaw Brothers.

H. R. Puckett, division machinist for Stanolind Pipe Line Co., with headquarters at East Ft. Madison, Ill., has been promoted to area master mechanic for the company's Nebraska area with headquarters at Scottsbluff, Neb. **E. A. Slade,** construction superintendent, and **J. C. Stirling,** authorization supervisor, have been appointed members of the operating conference of Stanolind Pipe Line Co., a special advisory group to the board of directors.

W. K. Whiteford, president of British American Oil Co., Ltd., has been named to the board of directors of the Bank of Nova Scotia.

David S. Frank, superintendent of Pure Oil Co.'s Toledo Refinery, has been elected chairman of the Toledo section of the American Society of Mechanical Engineers.

Dr. Robert Wheeler, consulting geologist at Oklahoma City, is leaving this month to attend the meeting of the International Geological Congress at London, August 20-September 1. Wheeler will deliver a paper on the geological significance of the world's deepest test for oil—Superior Oil Co. 1 Weller, Caddo County, Oklahoma.

C. O. Puckett, landman for C. H. Murphy & Co., El Dorado, Ark., has been transferred to Midland, Tex., as land agent for the West Texas district. **Ray M. Devero,** formerly with Skelly Oil Co., has joined the C. H. Murphy Co. as landman.

W. Paul Edman, chief scout for Tide Water Associated Oil Co. in Houston, has been reelected president of the Texas Gulf Coast Oil Scouts and Landmen's Association. Other new officers are **W. E. Brown,** Shell Oil Co., Inc., vice president; **W. B. Kendrick,** Magnolia Petroleum Co., treasurer; **T. E. Weatherly,** Pure Oil Co., secretary; and **Hill C. Adams,** American Republics Corp., publicity chairman. **J. C. Nixon,** Superior Oil Co. of California, was named a delegate on the nominating committee of the national association.

Ford F. Turner, land agent for Pure Oil Co. in Michigan the past 11 years, has retired after 29 years with Pure Oil in virtually all sections of the country in which it operates.

C. G. Kirkbride, director of laboratories for Houdry Process Corp., has been elected vice president in charge of research and development for the company. Prior to joining Houdry he was a professor of chemical engineering at Texas A. & M. College. He has served as chief of chemical engineering development for Magnolia Petroleum Co. at its Dallas laboratories; assistant director of research for Pan-American Refining Co.; and as chemical engineer in the Whiting laboratories of Standard Oil Co. (Ind.) Besides being a director of Houdry Process Kirkbride is also a director of the American Institute of Chemical Engineers and is secretary-treasurer of the petroleum chemistry division, American Chemical Society.

T. B. Campbell, division engineer in Houston for Stanolind Oil & Gas Co.'s Texas-Louisiana Gulf Coast division, has been named district superintendent of the West Texas district at Midland, Tex. He has been succeeded by **T. C. Borland,** formerly assistant division engineer. Promotions and transfers in Stanolind's Texas-Louisiana Gulf Coast division include: **Thomas B. Malloy,** field engineer at Woodsboro, Tex., to petroleum engineer, southwest Texas district office at Corpus Christi; **Robert C. Hagens,** petroleum engineer in the Woodsboro area, to succeed Malloy; **Robert O. Williams,** petroleum engineer at southwest Texas district office, to same position in Houston division office; and **John W. Lord,** petroleum engineer in the Luby area, Robstown, Tex., to field engineer in the Luby area. In the company's North Texas-New Mexico division, **J. D. Christner,** petroleum engineer, Lubbock district, Lubbock, Tex., to field engineer, Levelland area. **Herbert B. Langford, Jr.,** mechanical engineer, manufacturing department, Slaughter plant, Levelland, to senior mechanical engineer. In the Tulsa office **C. P. Allen,** operating engineering, manufacturing department, to operating engineering supervisor; **A. J. Inderrieden, Jr.,** junior petroleum engineer, producing department, to depreciation engineering supervisor, economics department.

Arnold I. Richardson, formerly credit manager of Sun Oil Co.'s Newark, N. J., district, has been appointed assistant general credit manager of the company.

Howard Pew, of the land department for Sun Oil Co., has resigned to become head of the land department for Turner Petroleum Corp., Mt. Pleasant, Mich.

Frank and **George Frankel,** independent oil operators of Houston, will establish district geological offices in Midland as soon as a new building there is completed.

Arthur T. Smith, attorney formerly associated with a Denver, Colo., law firm, has joined the legal department of Continental Oil Co. in Denver.

Glenn H. Bowes, assistant region geologist for Continental Oil Co. at Los Angeles, Calif., has resigned to become manager of the exploration department of Hudson's Bay Oil & Gas Co., Ltd., an affiliate of Continental. Hudson's Bay maintains headquarters at Calgary and Winnipeg. Bowes has been with Continental for 25 years serving as geologist and assistant region geologist at Los Angeles. He is a graduate of Stanford University in petroleum geology.

J. E. Letson, formerly vice president and general manager for Transit & Storage Co., Port Huron, Mich., has been elected president. Other newly elected officers of the company are **M. J. Morash,** secretary, to vice president; and **T. F. Johnson,** assistant treasurer to treasurer.

E. E. Holden has been appointed superintendent of maintenance of McCarthy Chemical Corp.'s new plant at Winnie, Tex. He was assistant superintendent of maintenance for Dow Chemical Co. before joining McCarthy about a year and a half ago.

L. B. Snedden, formerly district geologist for The Texas Co. at Bakersfield, Calif., and supervisor of the company's geophysical operations in California, has been promoted to assistant manager of the geophysical division in the producing department with headquarters in Houston. Snedden, a Californian, attended Occidental College and was graduated from Stanford University with an A.B. and M.A. degree in geology. He taught geology at Stanford and Pomona College before joining The Texas Co. in 1935.

Harold Sydnor, formerly coordinator of fuel products operations for Esso Standard Oil Co., has been named assistant to the vice president in charge of manufacturing. Sydnor, a member of Esso Standard for 28 years, joined the company after graduation from the Virginia Military Institute in chemical engineering. During World War II Sydnor served with the Petroleum Administration for War. Other personnel changes in the company include: **Thomas W. Moore,** who was named coordinator of refining operations and assistant to the general manager; **Herbert R. Poland,** also named assistant to the general manager; and **Claude J. Bigelow,** who was appointed coordinator of East Coast refining operations and secretary of the East Coast Manufacturing Committee succeeding Moore.

W. A. Kirk, California Southern Oil Co., has been named president of the California Natural Gasoline Association to succeed **Frank J. Colton,** Tide Water Associated Oil Co. Kirk joined the association soon after its inception and has been active in its work since 1926. He has served on the board of directors for the past 15 years and in the capacity of vice president for the past year. **J. B. Taylor,** Signal Oil & Gas Co., was named vice president.

SHIFTS—

C. R. Hopper, enginer, Rexco, Morro Bay, Calif., to Maracaibo, Venezuela; **Raymond L. Patton,** engineer, The Texas Co., Santa Paul to Fellows, Calif.; **C. W. Gore,** superintendent, Markham Drilling Co., Albany, to Cisco, Tex.; **Charles J. Delancey,** geologist, Humble Oil & Refining Co., Brenham to Houston, Tex.; **A. Fanestiel,** engineer, Humble Oil & Refining Co., Goose Creek to Baytown, Tex.; **Byron E. Franklin,** superintendent, Humble Oil & Refining Co., Goose Creek to Baytown, Tex.

V. E. Lehmberg, engineer, Shell Oil Co., Inc., Houston to Pasadena, Tex.; **G. C. Merket,** geologist, Atlantic Oil & Refining Co., Midland to Cisco, Tex.; **Russell Guffey,** superintendent, Roy Guffey Drilling Co., Gainesville to Freer, Tex.; **S. T. Duree,** superintendent, Cities Service Oil Co., Victoria to Houston, Tex.; **Bill R. Payne,** geologist, Humble Oil & Refining Co., Brewton, Ala., to Houston, Tex.; **L. R. Hudson,** foreman, Shell Oil Co., Inc., Patoka to Benton, Ill.

C. K. Chenney, superintendent, Sohio Pipe Line Co., Grayville to Centralia, Ill.; **L. E. Ostrom,** superintendent, Roy H. Laird Co., Olney, Ill., to Kilgore, Tex.; **Joseph R. Ault,** engineer, Carter Oil Co., Forest, Miss., to Vernal, Utah; **William D. Morrison,** superintendent, Esso Standard Oil Ci., Linden, to Rahway, N. J.; **Alfred S. King,** engineer, Houdry Process Corp., Swarthmore, Pa., to Los Angeles; **Charles N. Hefner,** engineer, Mud Control Laboratories, Vernal, Utah, to Lindsay, Okla.

Rex E. Flynn, engineer, Stanolind Oil & Gas Co., Midwest to Elk Basin, Wyo.; **Charles C. Frye,** engineer, Continental Oil Co., Ponca City, Okla., to Denver, Colo.; **Byron W. Berthelot,** engineer, Phillips Petroleum Co., Amarillo, Tex., to Eureka, Kans.; **E. Deckard,** superintendent, Wheless Drilling Co., Carthage to Lufkin, Tex.; **Maxey Brooke,** chemist, Alamo Refining Co., Brazoria to Old Ocean, Tex.; **M. L. Hall,** engineer, Texas Petroleum Co., New York, to Caracas, Venezuela.

Donald S. McBride, engineer, Tide Water Associated Oil Co., Mountain View, Okla., to Kilgore, Tex.; **C. C. Dye,** engineer, Stanolind Oil & Gas Co., Tulsa, to Beaumont, Tex.; **Arthur H. Petsch,** geologist, Ohio Oil Co., Hobbs, N. M., to Guatemala City, Guatemala; **J. J. Pitts,** foreman, Robert H. Ray Co., Jasper to Beaumont, Tex.; **F. W. Perrin,** geologist, United Geophysical Co., Inc., Sudan, Tex., to Calgary, Alta.; **M. W. Sandefer,** superintendent, Henderson Drilling Co., Bay City to Humble, Tex.

Lewis M. Thompson, engineer, Stanolind Oil & Gas Co., Brownfield to Levelland, Tex.; **C. L. Lapointe,** foreman, Sinclair Refining Co., Fort Worth, Tex., to East Chicago, Ind.; **C. T. Riley,** superintendent, Superior Oil Co., Midland, Tex., to Farson, Wyo.; **Edward G. Spottswood,** engineer, Pan American Refining Corp., Texas City to Galveston, Tex.

V. B. Sullivan, superintendent, Nicklos Drilling Co., Eunice, La., to Houston, Tex.; **Hugh Porter, Jr.,** foreman, Seismic Explorations, Inc., Poplarville, to Columbia, Miss.; **George T. Thomas,** geologist, Ohio Oil Co., Findlay to McComb, Ohio; **R. E. Stanton,** engineer, Station Chemical, Inc., Denver, Colo., to Corpus Christi, Tex.; **J. P. Quillin,** engineer, Sohio Petroleum Co., Edmond to Oklahoma City; **Robert J. Torrens,** engineer, Chinese Petroleum Corp., San Pedro to Long Beach, Calif.

DEATHS

Charles Francis Dickson, 65, retired engineer for Indian Refining Co. (now a sudsidiary of The Texas Co.), died July 23 in Cincinnati, Ohio.

Virgil M. Wile, 53, retired oil-field driller, died August 2 in Tulsa.

Charles H. Wingate, 79, retired lease superintendent for Colson Oil Co., Tulsa, died August 1 in Tulsa.

John Silas Prather, 73, oil producer of the Titusville, Pa., district, died July 26 in Titusville.

Ralph N. Andrus, 87, retired oil operator of the Pennsylvania area, died July 26 in Bolivar, N. Y.

Dennis A. Ryan, 72, independent oil operator who had previously served with Prairie Oil Co. and Gypsy Oil Co., died July 27 in Carmi, Ill.

Frederick A. Stevenson, 68, formerly president of American Car & Foundry Co., died July 29 in Wilmington, Del.

Robert E. Newcomb, retired works manager of the Holyoke plant of Worthington Pump & Machinery Corp., died July 24 in Holyoke, Mass.

Roland J. Ranck, superintendent for Wise - Jackson - Snedden, drilling contractors, died July 28 in Tyler, Tex.

Albert F. Dohn, 72, retired vice president and director of Allegheny Ludlum Steel Co., died July 29 in Albany, N. Y.

"Old way" compared with "new way" of breaking out drill pipe as done on Humble Oil & Refining Co.'s latest rotary rig. In the picture at right the remote control power tongs break out the drill-pipe stand with the pull of the hydraulic cylinder at right, under complete control of the tong operator. Note the maze of hydraulic lines to the hydraulic spinning motor on top frame

Humble's No. 30

World's Most Automatic Drilling Rig

Unit Considered a "Field Lab" for New Drilling Equipment

by Leigh S. McCaslin, Jr.

WHAT is probably the world's most automatic drilling rig is currently making hole for Humble Oil & Refining Co. in Sugar Valley field on the Texas Gulf Coast, 60 miles southwest of Houston.

Most unusual feature of this automatic rig is the remote-control pipe racker which takes the work out of racking pipe. The derrick man and a floor man control this equipment from comfortable seated positions by merely turning control handles. The only manual labor involved in the operation is unlatching the elevators. Even this hand operation will be eliminated when automatic elevators, now under construction, are completed. The "monkey board" is no longer a monkey board to the roughnecks. They now lovingly call it a "throne of paradise."

Coupled with the remote-control pipe racker are remote-control power tongs which eliminate the manual handling of tongs. The tongs are controlled by the same floor man that operates the pipe racker from his seated position.

The pipe racker and tongs, however, are only two of many features found on this astounding rig. Also, they are not necessarily the most important features from the standpoint of making more hole and saving money. Among the other features of the rig are:

1. High-fluid-velocity bits.
2. Improved mud-mixing device.
3. "Walking feed-off brake."
4. Automatic bit-weight control.
5. Rotary speed governor.
6. Air throttles.
7. Hydraulic slips.
8. Air-operated greasing unit.
9. Dull-bit indicator.
10. Surge tanks to permit pump compounding.
11. Rubber slips.
12. Electronic weight indicator.
13. Universal-type joint in standpipe to eliminate hose kinking.
14. Kelly drive bushing equipped with steel balls in place of roller bearings.
15. Hydraulic hose replacing pipe and fittings on blowout preventer.
16. Air compressor permanently mounted in substructure.
17. Utilization of steam exhaust to provide forced draft in boiler stacks.
18. Standpipe bypass valve.
19. Drilling rate meter.

Rig Is Field Laboratory

Humble's Rig 30—a heavy-duty steam rig—is considered by the company as a field laboratory for drilling equipment. It was selected for this purpose for several reasons, chief of which were: (1) closeness to Houston, the concern's headquarters

Old way versus new way, up in the derrick. Derrick man—1948 version—racks pipe with ease from his "throne of paradise." The pipe is racked by the electrically operated arm shown grasping the pipe at lower left in photo. The arm is controlled by a single control handle similar to the aircraft "joy stick" which is tilted in the direction of desired motion

town, and (2) the existence of a thick section of uniform shale in Sugar Valley field which provides uniform drilling conditions for test purposes.

The basic reasoning behind Humble's drilling-equipment development program is explained by company engineers as follows:

By 1945, as the war neared its end, the trend toward deeper drilling to find new reserves was established, and manufacturers began designing equipment to drill down as far as 20,000 ft. More horsepower was required for hoisting long strings of pipe, and the weight of drilling equipment to meet these peak demands increased accordingly. Deep-hole experience indicated then that heavy powerful rigs were not the only requirement for deeper drilling, however. The higher costs of deep drilling demanded equipment vastly more efficient.

The duration of repetitive operations, especially round trips, increases greatly with depth, so much that often more time is consumed changing bits than drilling below 10,000 ft. Harder formations found at greater depths reduce bit life rapidly, resulting in more frequent round trips as the bit goes below 10,000 ft. In addition, more rig time is consumed and the hole left open longer, an added blowout hazard.

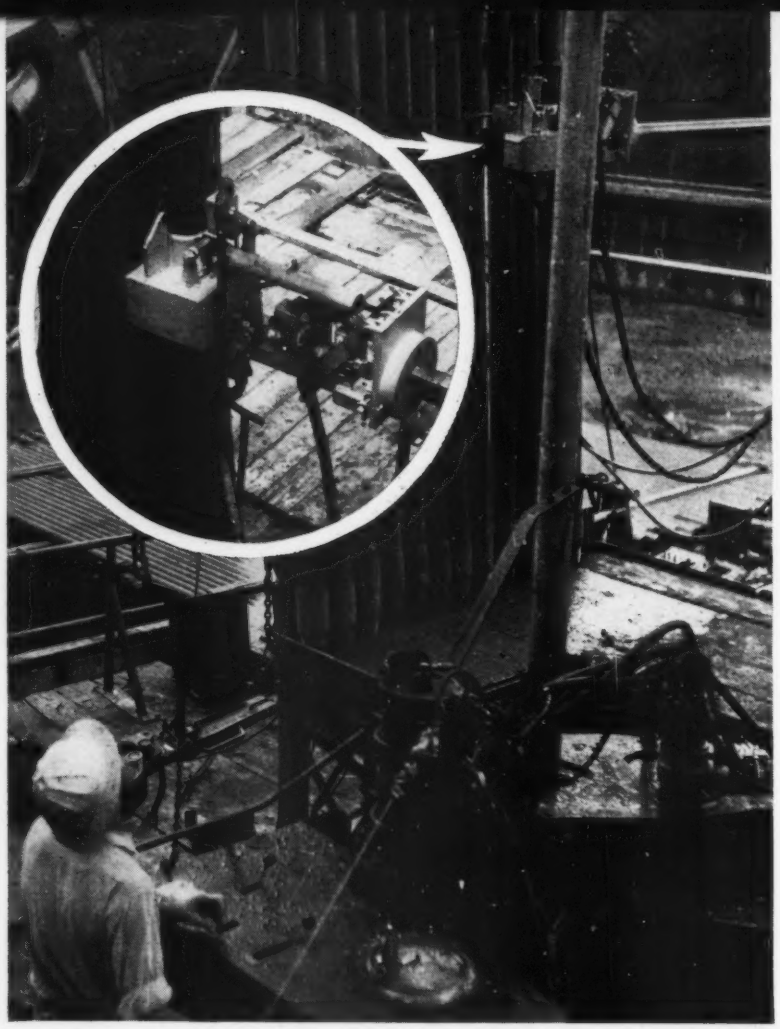
With these facts in mind, Humble engineers began investigating the problems with a view to improving drilling safety, reducing the actual work of the crews, and protecting deep holes. Automatic equipment for drilling was seen as necessary for development of any large-scale drilling programs approaching the extreme depths which have already been attained. In addition, automatic equipment will prolong the useful working life of drilling crews carrying out todays drilling operations. Of most importance, however, operating safety will be greatly improved and the drilling crews will be able to do more maintenance work and housekeeping.

Remote-Control Power Tongs and Pipe Racker

Initial arrangements were complete and work began on the remote-control power tongs and pipe racker in September 1945. Field operating tests on Rig No. 30 began on April 28, 1948. As finally developed, the remote-control power tongs and pipe racker are a joint development of Humble and Byron Jackson Co. of Los Angeles.

Most of the physical effort of making round trips and drill-pipe connections has been eliminated by the remote-control power tongs and pipe racker. The derrick man and tong operator control this equipment from seated positions. The driller has been relieved of operating the cathead and only operates the slips, hoisting engine, and brakes with air controls. The other rotary helper on the floor

Tongs swing around to latch on drill pipe as the driller sets the air slips. Note the control valve handles in front of the tong operator



In the foreground, a joint of pipe is being broken out by the remote-control power tongs. The special elevated pipe rack used with the automatic pipe racker can be seen behind the tongs. The inset shows close-up of the lower pipe-racking arm as it has just placed a stand of pipe in the special platform used for automatic racking

merely latches and unlatches the elevators. Although the speed of pulling one stand with the new equipment is only a little greater than is possible with conventional hand operation, this speed can be maintained indefinitely regardless of hole depth, whereas fatigue slows crews working conventionally during long trips. (Tongs in use today weigh approximately 380 lb., and slips weigh about 180 lb.) Safety is substantially improved, as the derrick man need not move from his seat on the monkey board up in the derrick. Also, the tong lines and spinning chain are eliminated from the derrick floor.

The remote-control pipe racker consists of two electrically operated "arms," one at the monkey board and one on the first girth on the ladder side of the derrick. The arms grip the pipe and move it to the desired spot on an elevated pipe platform when coming out of the hole, and pick it up from the platform and carry it to the power tongs when going in the hole. The upper arm is operated by the derrick man on the monkey board and the lower arm by the tong operator on the floor. Each arm is controlled by a single control handle similar to an aircraft "joy stick" which is tilted in the direction of desired motion. Simultaneous motion in two directions is possible, permitting quick movement to any spot within the operating area. A trigger mounted on the control handle releases the grip on the pipe as desired.

The racker arms are actually 3-in. lead screws and are powered by 3-hp., 220-volt, a.c., 3-phase electric motors. The propulsion units for the lower and upper units are identical, except that the monkey board moves along the side of the derrick with the upper racking unit.

No weight is supported by the upper arm, and a safety shear pin permits the hand to rotate downward and release the grip should the arm become overweighted. The lower arm grip or "hand" incorporates an auxiliary elevator for lifting the stand out of the tongs and off the pipe platform. This elevator is actuated by a push-button-controlled hydraulic cylinder mounted just under the monkey board and connected to the lower arm by a ⅜-in. wire line. The elevator is designed to support a 90-ft. stand of 5-in. E.U.I.F. drill pipe weighing approximately 2,000 lb.

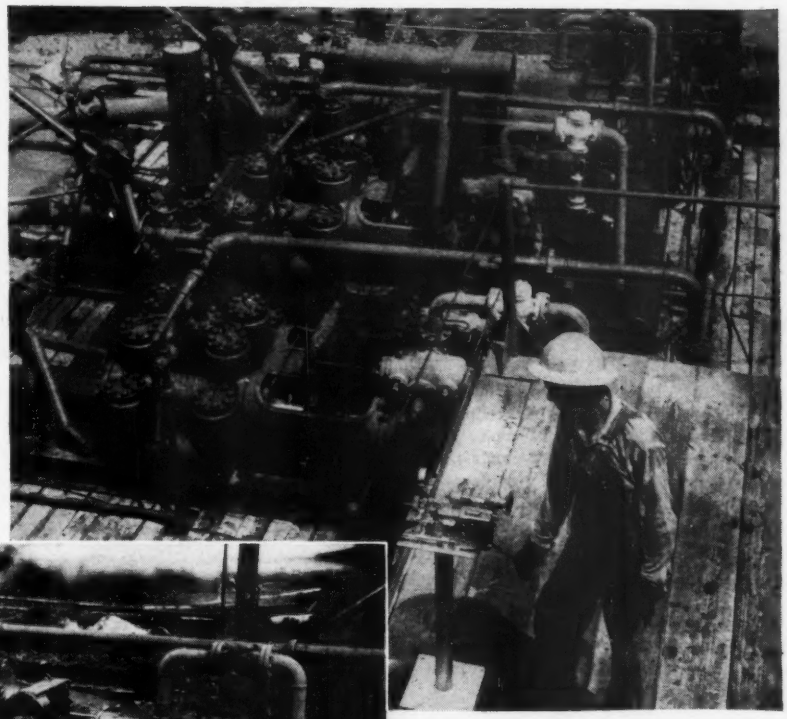
Drill pipe is racked on a special steel platform on the ladder side of the rotary. Currently the pipe is racked in a hayrake and fingers, normally racking four rows of 13 stands and two rows of 10, two of 8, and one row of 6 stands. With this arrangement 16,000 ft. of pipe can be handled.

This closeup of power tongs and operator was taken just as a joint had been broken. In the next operation, the upper tongs will "hand" the stand to lower pipe-racking arm which will rack the stand. These hydraulic-powered tongs will make up, break out, spin up and spin out any size pipe between 2⅞ and 8 in.

The monkey board is mounted on the upper racking unit, and travels laterally across the ladder side of the derrick. The board is equipped with a seat and handrails, the control handle and safety cutoff switch being located on the right handrail. The upper racking arm moves side-to-side with the monkey board, and the 10-ft. travel of the arm provides ample room to insure automatic latching of the elevators.

Tongs Have a Wide Range

Manual handling of tongs has been eliminated by the remote-control power tongs, which run 2⅞-in. drill pipe to 8-in. drill collars without adjustment. The hydraulic-powered tongs will make up, break out, spin up, and spin out any size pipe in that range with equal ease. The tong operator faces the driller as he controls these operations with eight hydraulic valves mounted in the tong control box.



Above: Crewman operates the air valve which controls the two mud pumps in the background. All normal control of pumps during drilling is from this pedestal. Pneumatic valves control the pumps, slips, draw-works brakes and automatic controls

Left: The shiny valve in center of picture is the air throttle used to control the steam-driven slush pumps. In addition to the hand control being adjusted by the man in the picture, a remote-control stand is located on the engine platform. Note the surge chamber at upper left

The power tongs, operator's seat, and control box are mounted on a 6-in. column 4 ft. from the center of the rotary on the draw-works side. The supporting column is bolted to the substructure and guyed to the derrick at the top. A hydraulic lift built into the column provides a 3-ft. vertical travel of the entire unit, permitting operation at any height in that range and allowing the driller leeway in setting the slips.

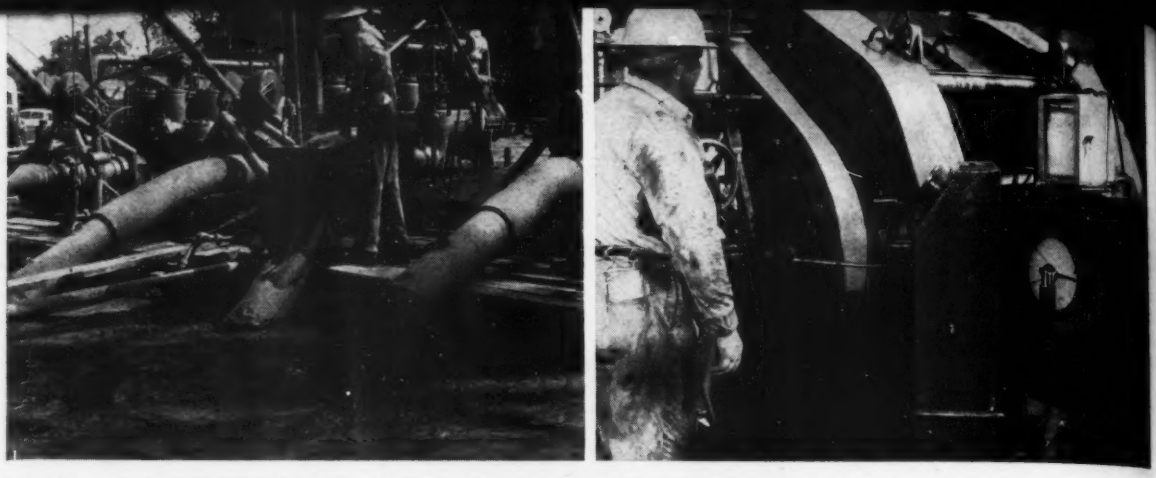
All operation is hydraulic, utilizing eight hydraulic cylinders and one hydraulic motor to latch and unlatch the tongs, grip and spin the pipe, and carry it. The hydraulic motor develops 8,800 lb.-in. of torque and spins the knurled rollers at 80 r.p.m. A force of 15,000 lb. is used against the rollers for spinning.

Maximum breakout torque is 1,600,000 lb.-in. and maximum makeup torque is 800,000 lb.-in. Normal operating pressure is 1,500 psi., although 2,500 psi. is used for maximum torque. Hydraulic pressure is supplied by a 35-hp. pump which is interchangeable with the spinning motor on the tongs. The pump is powered by a four-cylinder engine mounted on a skid located under the engine platform which also contains the filters and 150-gal. hydraulic oil supply tank.

"Jet" Bits Cut Drilling Time in Half

High fluid velocity (or "jet") bits representing results of 5 years of research are in use on the auto-

In addition to devices for maintaining constant feed and uniform bit weight, a rotary speed governor is incorporated in the rig. Besides contributing to drilling efficiency, it prevents possible damage to the drill pipe or rig due to overspeeding. The governor is being oiled by Buck Kimble, driller



Left: This dry chemical hopper is a part of the Humble-designed mud mixer used on Rig 30. The mixer somewhat resembles an outboard motor and is designed to eliminate the third slush pump on a drilling rig. It is operated by a 10-hp. steam turbine. H. L. Dietz, derrick man, is adding the chemicals. Right: Driller's position on Humble's field laboratory for drilling equipment. The dial face on the right, with Amos Yarbrough at controls, is part of the electronic weight indicator used on this highly automatic rig. The shiny, knurled knob in the center of the dial face is used by the driller to set the desired weight on the bit. This weight is maintained automatically by control equipment on the rig. The instrument on top of the weight indicator is a drilling rate meter

matic rig.[1] Humble's petroleum-engineering division reports up to 50 per cent reduction in the time required for actual drilling operations (including drilling, round trips, slope tests, conditioning mud, etc.). This has been accomplished by the combined use of the jet bits and greater bit weight. In terms of rig time, this faster drilling means a saving of approximately 21 days on 9,000-ft. holes.

High-fluid-velocity bits derive their name from the fact that the watercourse nozzles are designed to direct the maximum mud velocity on the chips cut by the bit blade rather than on the blade. The major function of the mud stream, directed forward of the blade, is the disintegration and pulverization of the chips. Maximum improvement is attained with greater bit weights, up to 40,000 lb. having been successfully used. This is significant in the Gulf Coast area, where "balling up" has prevented drilling with such heavy weight where ordinary bits have been used.

The idea for one of the most interesting items in use on Rig 30 came from watching outboard motor boats running up irrigation canals. This item is the novel mud-mixing device. It is designed to reduce the high horsepower requirement entailed by the use of conventional mud-mixing devices. Only 10 hp. is required for the Humble development as contrasted with the conventional 100-150 hp.

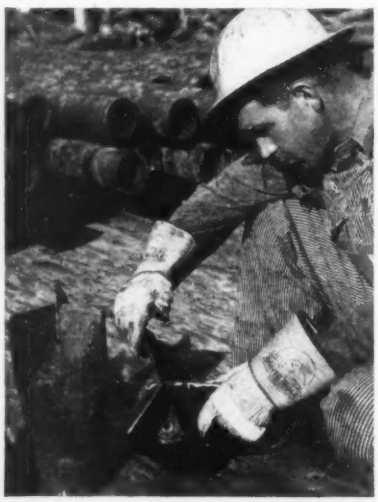
Mud Mixer Eliminates Third Pump

Ordinarily, the third pump on a rig is required to furnish the power for mud mixing. The Humble device is operated by a 10-hp. steam turbine thus eliminating the use of the third pump. In appearance it is somewhat similar to an outboard motor. Turbulence is generated by two propeller blades and vanes on the propeller shaft. In action, one of the mixers will provide a high rate of turbulence in all parts of a normal-sized mud pit.

An interesting feature on the mud mixer is a built-in hopper for adding dry chemicals to the mud. The mixer breaks the chemicals into small particles before admitting them to the mud stream, if this should be necessary. In addition, the chemicals are introduced into the propeller wake of the mixer, thus insuring thorough mixing.

Automatic Control of Bit Weight and Line Feed-Off

A new type automatic control, adaptable to any make feedoff device, has recently been installed for use with the Humble - developed "walking feedoff brake." This equipment, under development for several years, permits the driller to set the weight he desires to carry on the bit on a dial and the control unit will automatically set the feedoff of the brakes to maintain that weight.



Pat Lowry, driller, examines a "jet" bit. Humble's petroleum-engineering division reports up to 50 per cent reduction in actual drilling time in soft formations by the use of this type bit. In terms of rig time, this faster drilling means a saving of approximately 21 days on 9,000-ft. holes

Automatic weight control insures that the bit is always digging at the fastest rate (assuming the proper weight is set on the bit). The possibilities of twisting off the drill pipe due to excess weight are greatly reduced, holes are straighter, and the bit digs faster and longer. Hand operation usually results in either too much or too little weight most of the time, both reducing the rate of penetration.

The walking brake[2] permits feedoff of the drilling line at a controlled rate. It consists of two independent air brakes, one on each drum of the draw works, which are engaged alternately. Hydraulic cylinders are connected to each brake, which permit the brakes to rotate a short distance with the drum. The speed of rotation of the drum is controlled by varying the restriction of the hydraulic fluid flow from the engaged brake side to the opposite hydraulic cylinder. The brakes "walk" because only one is engaged at a time. During a trip, the driller's air-control handle operates both brakes together as in conventional braking.

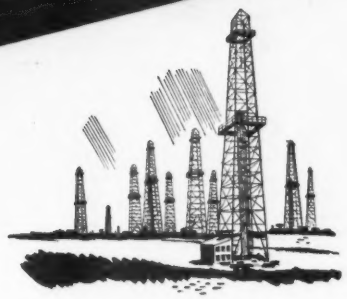
A newly developed drilling-rate meter is used in conjunction with the automatic control. The drilling-rate meter is on top of the weight indicator, in view of the driller, and reads like a speedometer. It both indicates and plots penetration rate directly in feet per hour against depth or time, as desired.

As a safety factor, a drill-pipe torque-control apparatus is built into the automatic control equipment. This apparatus shifts the control from weight to drill-pipe torque when the torque reaches a predetermined value.

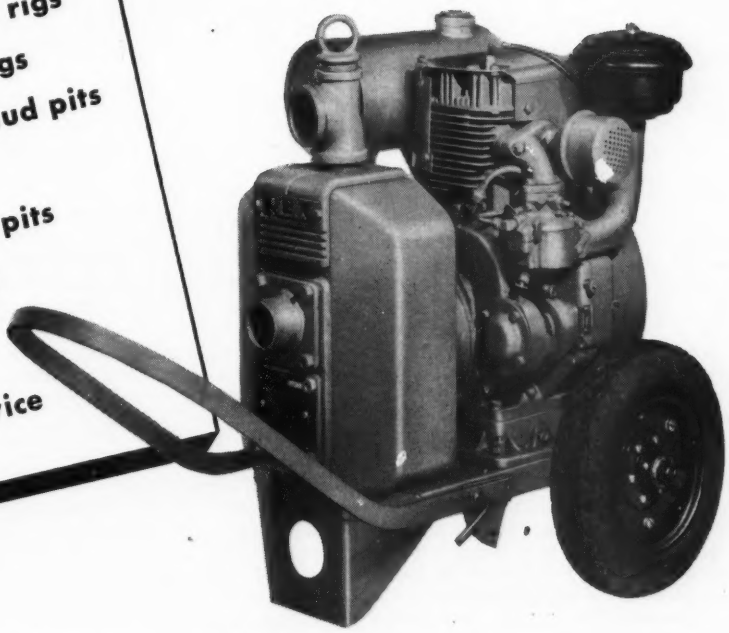
The importance of maintaining an automatic feed and uniform weight on the bit increases with depth because (1) the formations are usually harder, (2) the drill pipe driving the bit is under greater stresses, and (3) round trips are more time consuming.

THERE'S A NEW LITTLE YELLOW PUMP –

Around the Rigs!



- Pumping water to the rigs
- Washing down the rigs
- Jetting water into mud pits
- Draining ditches
- Pumping out slush pits
- Transferring slush from pit to pit
- General dewatering service



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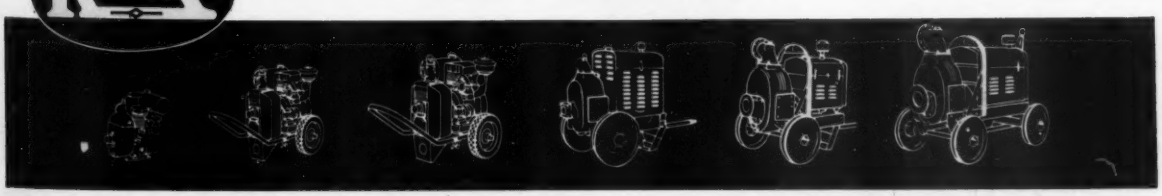
REX OIL FIELD PUMPS



CHAIN BELT COMPANY *of* MILWAUKEE

Heavier equipment for deep drilling is less sensitive to the feel of the operator, which makes automatic control even more important with greater depths.

Rotary-Speed Governor

In addition to the devices for maintaining constant feed and uniform bit weight, the rig is equipped with a new type governor to maintain constant rotary speed. Standard governors available on the market do not have sufficient range for the requirements of rotary drilling, according to Humble engineers. Hence, Humble has developed an entirely new type of governor. The governor is controlled by an air cylinder rather than being spring-actuated as is common. It provides control over a range of from 30-300 r.p.m. Use of this governor, in addition to contributing to drilling efficiency, prevents possible damage to the drill pipe or the rig due to overspeeding.

Air Throttles on Engine and Pumps

Although air throttles have been used to a considerable extent, their use on steam rigs is new. On Rig 30, air throttles have been installed on the draw-works engine and the mud pumps. The pump throttles are mounted on the engine platform making it unnecessary to walk out to the pumps to control them. One or both pumps may be controlled from the engine platform by the air throttles. Surge chambers are used on the pumps to eliminate excessive pulsations in the hydraulic system.

A special air-operated standpipe bypass valve idles the mud pumps and circulates the drilling mud to the pits while drill-pipe connections are being made. This bypass valve operates automatically when pump speed is reduced to a predetermined level. This prevents the pumps from losing their prime, as they would normally be shut down during this time.

Slips and Greasing Unit

Standard air slips which are gaining widespread acceptance in the oil industry are being used on the Humble automatic rig. However, hydraulic fluid is being used in place of air to operate the slips. This has been done for safety purposes to permit the hydraulic system of the slips to be tied in to that of the remote-control power tongs.

Another interesting feature is the air-operated greasing unit. It is quite similar to that used in service stations. Only one grease hose is used and it is spring-loaded and mounted on a reel that is permanently positioned on the engine platform. The hose is long enough to reach any point on the derrick floor or engine.

Miscellaneous Features

A dull-bit indicator has been incorporated into the design of the jet bits. The indicator consists simply of a blind water course. The blind end of the course is on the bottom end of the bit. Design is such that when drilling has worn off enough of the bottom of the bit to open the water course, the bit is ready for replacement. The opening of the water course will cause an immediate change in pump pressure thus indicating to the driller that it is time to come out of the hole.

A newly developed item that is under test is a set of rubber slips. Utilizing a manufacturing process which is an outgrowth of the war, rubber replaces much of the steel in the construction of the slips. The rubber slips weigh only 100 lb. as compared with around 180 lb. for the conventional type.

The electronic weight indicator being used takes its reading from the hook rather than the deadline. This eliminates crown-block friction in the weight reading. A universal-type joint at the top of the standpipe is designed to eliminate the hose kinking which sometimes occurs when a connection is being made.

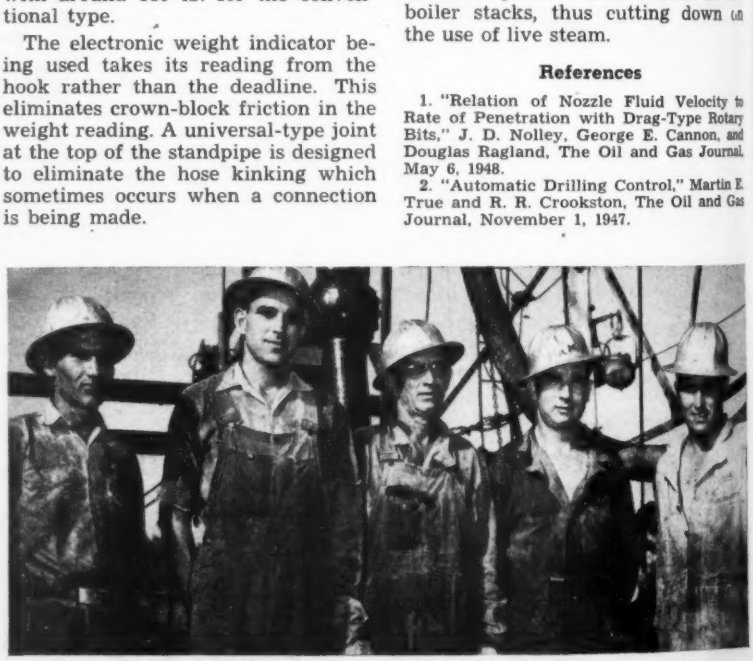
Key personnel connected with Humble's Rig No. 30 are shown here. The men are: T. J. Fuson, Gulf Coast division petroleum engineer; M. E. True, coordinator of equipment research, petroleum-engineering division, under whom the automatic equipment was developed; L. M. Duhon, Sugar Valley district petroleum engineer; G. W. Roberson, Sugar Valley district superintendent; A. R. Minscher, production geologist; J. C. Greene, tool pusher

Steel balls are being tested in place of the standard roller bearings in the kelly drive bushing. The purpose of this design is to provide more bearing surface on the kelly for driving purposes. A hydraulic hose on the blowout preventer replaces the pipe and fittings normally used to control this equipment. This move is designed to reduce the tearing down and rigging-up time of the preventer. In addition, the hose is easier to move and less likely to be lost en route.

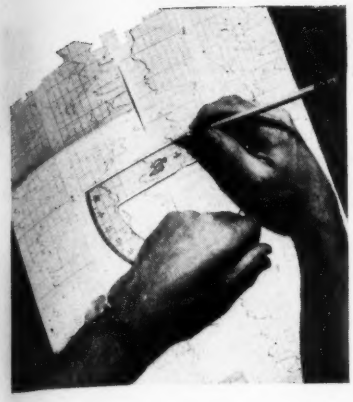
The air compressor used to supply the rig's needs is permanently mounted on the substructure. This, of course, reduces moving time. A feature of interest is the utilization of exhaust steam to provide forced draft in the boiler stacks, thus cutting down on the use of live steam.

References

1. "Relation of Nozzle Fluid Velocity to Rate of Penetration with Drag-Type Rotary Bits," J. D. Nolley, George E. Cannon, and Douglas Ragland, The Oil and Gas Journal, May 6, 1948.
2. "Automatic Drilling Control," Martin E. True and R. R. Crookston, The Oil and Gas Journal, November 1, 1947.



Evening tour crew on Humble's Rig No. 30: E. R. Howell, rotary helper; H. L. Dietz, derrick man; Buck Kimble, driller; J. R. Birmingham, fireman; V. W. Hillyard



Application of *Engineering* to OIL PRODUCTION PRACTICES

*by Harold S. Kelly**

ENGINEERING is the application of science to the needs of industry. The engineer must have sufficient knowledge of the basic science to understand what it is that has been proven possible. He must have a qualitative capacity to apply scientific facts to practical situations.

A thorough knowledge of basic science is an important tool of the engineer. A sufficient knowledge of the industry in which he is employed is essential to the intelligent use of this tool. Therefore, the processes of educating a successful engineer must involve two phases. The first is the cultivation of intellect and the acquisition of scientific knowledge through formal education. The other is the acquisition of a knowledge of the field techniques used in the industrial art wherein he is to practice his engineering talents. Education starts from a zero level and is a process that continues over most of a life time. It does not end on graduation day.

Unfortunately, but not without good reason, an engineering course emphasizes the tangibles in professional training to the near exclusion of the intangibles. The intangibles referred to are: establishing a long-term objective; planning a career; and consideration of certain nontechnical factors affecting the realization of such planning. Open discussion of these nontechnical factors and use of the resulting conclusions will lead to greater individual achievement. The first part of this discussion will cover the intangible factors and the second part will consider the application of engineering to the art of producing oil.

Selecting the Phase of Engineering Activity

The apprentice engineer should determine as early as possible the preferred type of work. A student who makes this decision early in high school has the advantage of selecting courses which will contribute more to education in the chosen profession. There is the hazard of making an erroneous selection due to lack of knowledge about the professions and due to immature judgment.

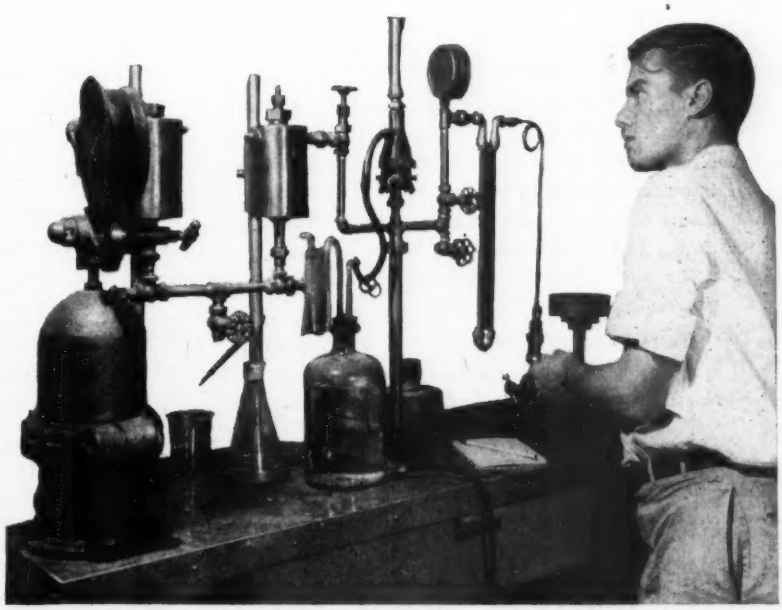
Selection of type of work should be based upon an appraisal of one's strong and weak traits and abilities. For example, a graduate engineer who has been out of college 12 years slighted early engineering assignments and attempted to work toward operations and a supervisory job because of prospects of higher pay. To date the supervisory job has not been obtained because of unsuitable personal characteristics. This man is now considered a poor engineer and the possibility of advancement has been diminished.

In a large corporation, very little in engineering is accomplished by

MAJOR COURSES AVAILABLE

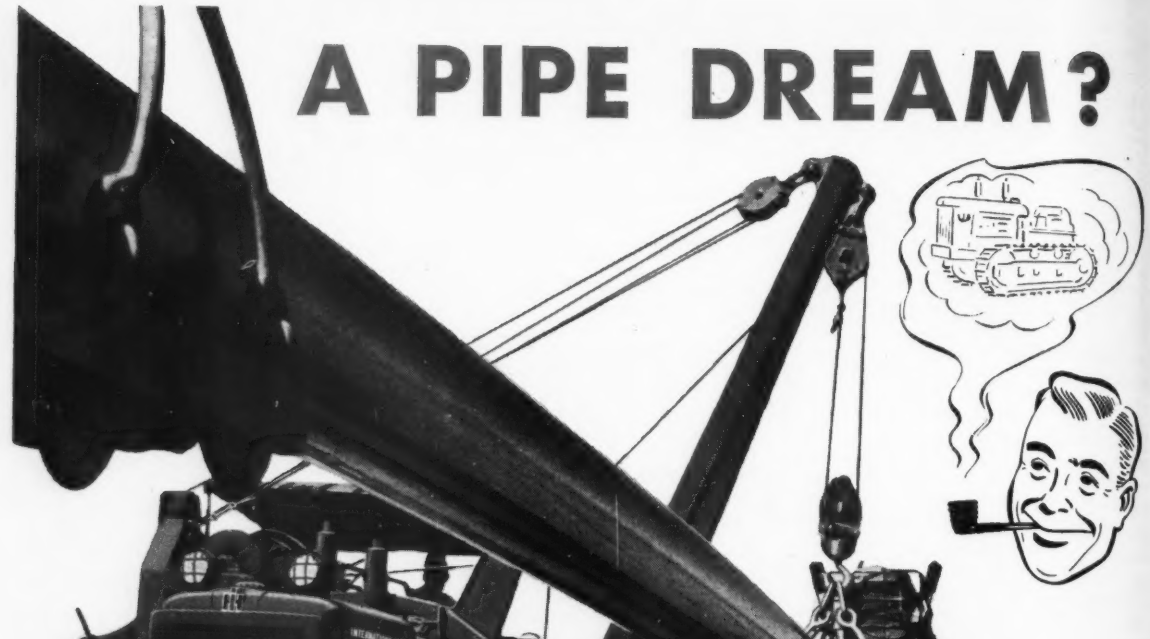
To a graduate in petroleum engineering or in any of the other major engineering courses, the broad phases of engineering available in the oil-producing industry are:

1. **Design and construction**
2. **Mechanical equipment design**
3. **Sales and service engineering**
4. **Research**
5. **Reservoir engineering and secondary recovery**
6. **Drilling and development**
7. **Production engineering**
8. **Production operations and supervision**



*Chief production engineer, Phillips Petroleum Co., Bartlesville, Okla. Paper presented as a talk before the Petroleum Engineers' Club at University of Oklahoma.

A PIPE DREAM?



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individual effort. Important achievements come from the joint efforts of several. For this reason personal conduct and work habits have a major influence upon the ability to become a smoothly working cog in the organization. There are a few principles of behavior and self-improvement that will be helpful to the engineer in assuming a position in an integrated organization. Some of these principles are:

Respect for the viewpoint and opinion of others.—Some engineers acquire a high regard for their ability to solve a problem and get the right answer. Getting the "right answer" is all that is considered necessary and a contemptuous or undiplomatic attitude may be taken with others who may not have "seen the light."

The correct solution is only one-half of the task and the solution or conclusion must be conveyed to the minds of others in an effective and congenial manner, either by a written report or by verbal discussion. The erroneous thinking of the other person must be changed over to the right conclusion diplomatically in a manner that will enable "saving face." Even the least capable engineer refuses to admit that a deduction, based upon facts or data considered, has been erroneous. A fellow worker is never forgiven who attempts to demonstrate a superior intellect by exposing personal errors of others.

These are some of the reasons why an average student may be more successful than the outstanding student. In research, particularly, it is unwise to carry the conviction that if a thing is not in the text book that it is impossible.

Once a scientist said of Thomas A. Edison, "This poor fellow is wasting his time. Two fundamental laws of physics prove that he is attempting the impossible. The first is that there can be no light without combustion; the second that no combustion can take place in a vacuum. Therefore, no light can be made in a vacuum." And Edison proceeded to perfect the incandescent lamp.

It is a quirk of human nature that man trembles at the thought of being the object of derision. It has cost mankind much. Sometimes the price of a laugh has meant the slamming of the door on fame or fortune or even immortality. An engineer should become hardened to the sting of derision; but respect must be maintained for the viewpoint of others.

"In the answer-getting process in industry there is need for the development of those principles of human relationship whereby differences in conclusions can be composed without loss of personal pride or without the injection of personal disrespect, with recognition that the partners in a joint effort are all dedicated to an effort to find the really correct conclusion."[1]

Development of the art of expression.—Effective expression is essential to selling ideas or promoting action by others. It is a reflection of personality. Mastery of language can be continually improved after leaving the university by reading, writing, and speech. The ability to prepare a well-written, concise report will mean the difference between success and failure in some engineering positions.

T. A. Rickard[2] calls attention to the fact that an engineer is employed for the purpose of laying the basis for management decision. The engineer is expected to arrive at conclusions and rcommendations and to derive them from facts, and upon analyses that can be clearly stated and confirmed. Such words or phrases as: about, very nearly, almost, approximately, the right order of magnitude, and others reflecting uncertainty or conditional situations, tend to create doubt and leave uncertainty in the minds of those who must exercise the management decisions based upon the engineer's recommendations. Many engineers write or speak in a manner that suggests hedging for the purpose of escaping responsibility. That is the best way to destroy confidence and respect. If the conclusion reached cannot be described simply as black or as white, and is so uncertain as to take on the quality of grayness, then the test of a competent engineer is his ability to come to the point and establish the several courses for executive action.

Rickard admonishes the engineer "to remember the reader" in offering written communications. Until an engineer accomplishes some outstanding work, his performance is known only by his writing in the form of letters, articles, and reports. No one can prepare an effective communication involving engineering analyses without a full regard for the problem the recipient of the communication will face in understanding what is intended to be transmitted.

Every communication is for the purpose of imparting one individual's conclusions to another. John Mills in his book[3] deals very effectively with the problem of this personal quality in an engineer. He calls attention to the fact that scientists and engineers by natural tendency will, through training in science, reason from cause to effect and in so doing they stress similarities between situations in arriving at conclusions. Executives are not scientists and do not think in terms of similarities. Theirs is not the cause to effect process of reasoning. The executive must spend his time choosing among differences, among consequences of courses of action. The executive responsibility is directed almost always to the question, "What's the difference?"

"When an engineer is asked to present recommendations, the tendency is too common for the engineer to invite the executive to run through the entire mental process used in deducing the conclusions respecting the situation. This is an exceedingly dangerous and ineffective procedure. The executives, not trained to reason from cause to effect, often lose patience with the engineer who insists that they adopt his procedure in arriving at a decision. The net result of the usual approach is loss of attention on the part of the executive mind or loss of respect for the engineer.

When the responsibility for drawing conclusions and recommendations rests with the engineer, as it should, the executive may, if he is forced to rehearse the entire procedure before receiving the answer, conclude that the engineer is incapable of reaching a decision and desires to place upon him the responsibility for drawing the engineering conclusion from the assembled analysis of the facts. If one is trained and is by reason of job responsibility required to think in terms of differences, then engineering reports should be rendered in terms of differences or in terms of consequences of courses of action. If one is trained and by reason of job responsibility thinks in terms of similarities, then the engineering report should be presented in that manner. Engineers must possess the personal quality of being able to make their work understandable."[1]

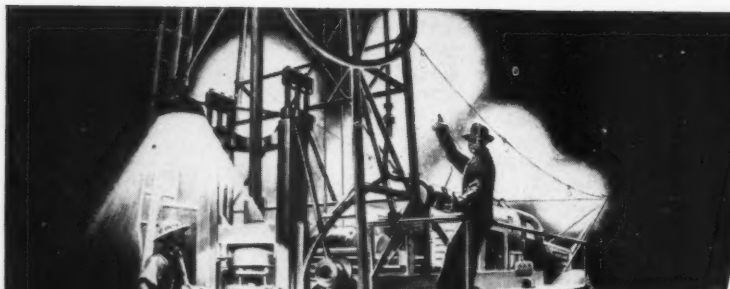
Influence of others by building up their self-confidence through complimentary remarks.—Criticism or negative statements often hurt the ego and confidence of the one to be influenced and little or no beneficial results are obtained.

Rockefeller, Knutson, and others, who have built up big industrial organizations, employed the principle of complimenting their subordinates and building up personal confidence as a means for engendering loyalty, enthusiasm, and outstanding performance. Most individuals perform better and accomplish more if recognition is freely given for abilities and accomplishments.

Performance of the job in the best possible manner.—One's readiness for advancement is not based upon his personal views but upon the manner in which his present duties are being handled. A job is an opportunity to demonstrate capacity for accomplishment.

"Satisfactory performance is a greatly prized quality. It can be summed up in three words: accuracy, thoroughness, and promptness. Spectacular performance is not expected; neither is it necessary. The million-dollar ideas and brilliant execution may come, but they originate from a minority. For the majority, getting the job at hand done is the thing that matters."[4]

Advancement of one engineer among a group of engineers usually



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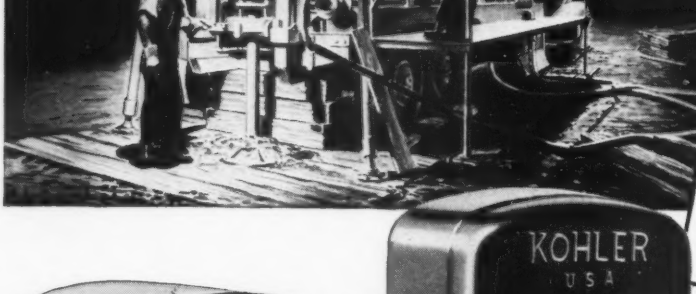

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rests upon a relatively narrow margin of superior performance by the one chosen. In industry, as contrasted to the university, the engineer is judged by the thoroughness of his analysis, with little consideration given to the time spent on the analysis within reasonable limits. In other words, the boss probably won't give much consideration to whether 8 or 12 hours have been spent on a problem as long as the final and correct answer is obtained in time to meet the situation. Thoroughness and accuracy are of greater importance than speed.

Patience with one's employer.—"The American system of formal training, as applied to the 4-year college man, comprises 16 to 17 years during which progress is reported by annual or semiannual promotion. He goes on the academic 'production line' at 6 and comes off at 22 or 23. Little wonder that the typical graduate becomes restive when in his first few years in industry he can't measure progress in terms of "A's," "B's," and "C's," and terms of frequent, regular promotions. His only mathematical measure is his pay check, which according to the psychologists always is 15 per cent less than the recipient thinks is deserved."[4] Job promotions and salary increases will not always come exactly when they are expected but for the long term, one's advancement will be about commensurate with his ability and performance.

Application to Oil-Production Practice

Although eight major phases of engineering were previously set out as being open to the petroleum engineer, the remainder of this discussion will be confined to the application of engineering to the art of producing oil as it usually is applied by a large oil company.

Petroleum production engineering may be divided into three broad types, namely: mechanical, general, and reservoir engineering. Each of these types may be broken down into lesser categories or subdivisions. These various categories are described here to emphasize the opportunities for constructive work that lay before the field oil-production engineering organization. In some cases these job opportunities will be described as responsibilities of the district organization but it is not intended that they accurately delineate the district engineering organization's functions or responsibilities.

The first broad type, mechanical engineering, may be divided into three main categories:

1. The constant search for new types of equipment and improvement of equipment in use. This may be termed research in some cases.
2. The application, choice, and proper installation of conventional equipment.
3. The efficient operation and maintenance of equipment and the effective utilization of special mechanical devices or tools.

In the first of these categories, the search for new types of equipment and the improvement of equipment in use, the mechanical engineer has the responsibility of recognizing equipment or parts of equipment which have relatively high operating or maintenance cost. He then has the problem of improving the troublesome part or of recommending a new and improved type of equipment. If it appears that an opportunity exists for considerable improvement over available manufactured equipment, a recommendation may be made that a development project be set up under the guidance of a mechanical development engineer in the general office. There usually are engineers in the general production office and in the research department who are directing their efforts toward the development of new and improved types of equipment.

The second category, the application, choice, and installation of all types of conventional surface and subsurface equipment, is chiefly the responsibility of the district engineering organization. This function is particularly important with respect to the correct installation of equipment and the proper application of loads upon it. The engineers in the district may have the benefit of consultation and advice from the division or general offices, particularly with respect to the selection of the manufacturer of the equipment.

The third category, the efficient operation and maintenance of equipment and the effective utilization of manufactured labor-saving devices or tools rests primarily upon the district engineering organization under the direction and guidance of the district superintendent. Assistance in this may be obtained through consultation with the manufacturers' service engineers or with lubrication specialists.

The second broad type, general engineering, may be divided into three categories peculiar to it, all of which are frequently the responsibility of the district organization. They are:

1. The search for new methods and improvement of current operating methods and procedures.
2. Effective utilization of special procedures or techniques.
3. Economic analyses.

The first category, the search for new methods and improvement of current operating methods and procedures can, in some cases, be initially studied by a job analyst if one is available. But in many cases where such a study indicates the need for improvement of equipment or tools, an opportunity is created for the engineer.

The second category, the effective utilization of special procedures or techniques, may include the evaluation of the services of outside organizations like those used in the development, completion, or workover of wells. Secondary-recovery operations also require the performance or supervision of special tests such as those made for obtaining the permeability profile. These functions may be primarily the responsibility of the district organization; however, consultation and advice may come from the division or general office.

The third category, analyses, includes the determination of the economics of operation of leases, wells, procedures, and methods. It also includes the assembly and analysis of data for special reports. This work is usually the responsibility of the district engineering group.

The third broad classification, reservoir engineering, consists of preparing or maintaining detailed reservoir studies in order that accurate and complete information will be constantly at hand for the solution of reservoir problems. The information must be worked up soon enough to be of benefit where problems exist.

The advanced reservoir engineer is usually located in the division or general office to maintain reservoir data and make special studies that will contribute to more efficient depletion of pools. The junior or associate reservoir engineers may be on the engineering staff of the larger district or on the division or general office staffs.

The reservoir engineer in the district makes recommendations on well workovers, deepening, acidizing, shooting, and abandonment. He may also furnish advice on the more efficient rates of flow for individual wells, leases, or pools in either primary or secondary recovery. The following of well and pool performance in gas drives or water floods with the view of determining the location and amount of injection and production volumes is an important function. In some cases, the engineer in the district who handles reservoir work will also have other duties of a different nature because there is not enough reservoir work to occupy the full time of one man and also because it is intended that the young petroleum engineer obtain a broader experience before becoming a specialist in reservoir engineering.

Supervision of Engineering

There is a certain amount of supervision connected with all three of the broad engineering divisions. The advanced engineer may be called upon to supervise other engineers, field testers, treaters, engine mechanics, or others who are performing specialized work. He may supervise only the method or procedure in certain cases whereas in others his supervision may be of broader scope.

(Continued on page 93)

RECLASSIFICATION OF CRANKCASE OILS

To Reduce Refining Costs, and Simplify Distribution and Supply

by Arch L. Foster

EFFORTS have been under way for a considerable period by some refining and automotive technologists to revise the partially obsolete crankcase lubricating-oil classification, for many years the identifying system for various grades of oil in terms of viscosity. Results to date indicate the likelihood of some agreement in the not too distant future. However, important differences of opinion exist among various engineers and groups in the two industries, created at least in part by variation in the interests of the two industries.

Several proposals for revision of the existing system have been advanced by different leaders. All of these point toward simplification of the present classification One of the chief objections is that too many grades are included in the present system. This places a needless burden and large expense on the oil-marketing branch of the industry.

The present oil classification includes seven grades (see Table 1). Two additional grades known as 10-W and 20-W are automotive manufacturers' viscosity classification for a light and a heavy winter oil grade. More recently a tenth grade has been proposed by the automotive industry for use under extremely severe low-temperature conditions, which will be discussed later.

Since these grades were adopted, far-reaching changes have been made in engine design, and in the refining of lubricating oils. These improvements have resulted in outstanding changes in the recommendations by oil suppliers and automotive manufacturers alike. The results are that

TABLE 1—CRANKCASE-OIL CLASSIFICATION

The S.A.E. viscosity numbers constitute a classification of crankcase lubricating oils in terms of viscosity only. Other factors of oil quality or character are not considered.

S.A.E. viscosity number	Viscosity range, Saybolt Univ., sec. At 130° F. Min.	At 130° F. Max.	At 210° F. Min.	At 210° F. Max.
10	90	Less than 120	...	...
20	120	Less than 185	...	...
30	185	Less than 255	...	...
40	255	...	...	Less than 80
50	...	...	80	Less than 105
60	...	...	105	Less than 125
70	...	...	125	Less than 150

Automotive Manufacturers' Viscosity Classification

Viscosity number	Viscosity range at 0° F., Saybolt Univ., sec. Min.	Max.
10W	6,000	12,000
20W	12,000	48,000

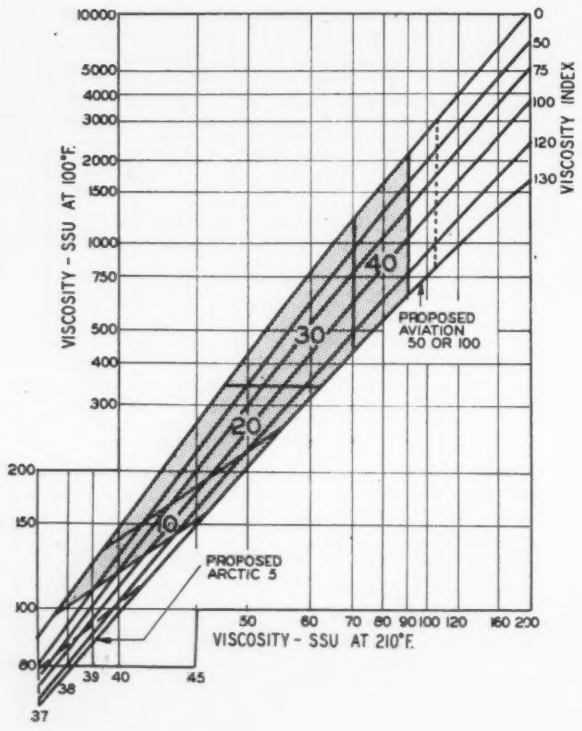
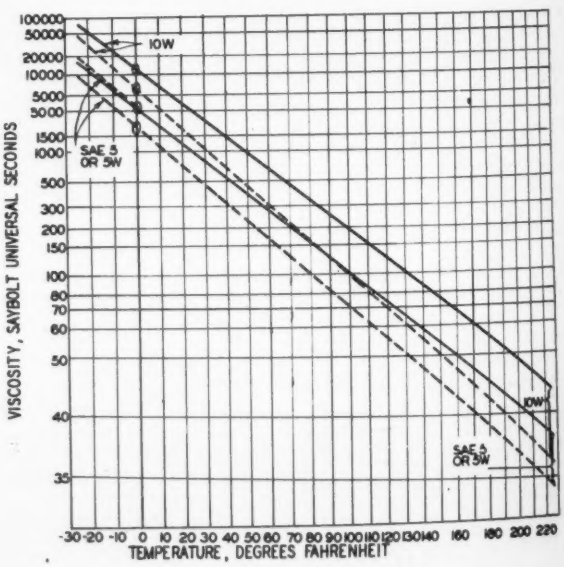
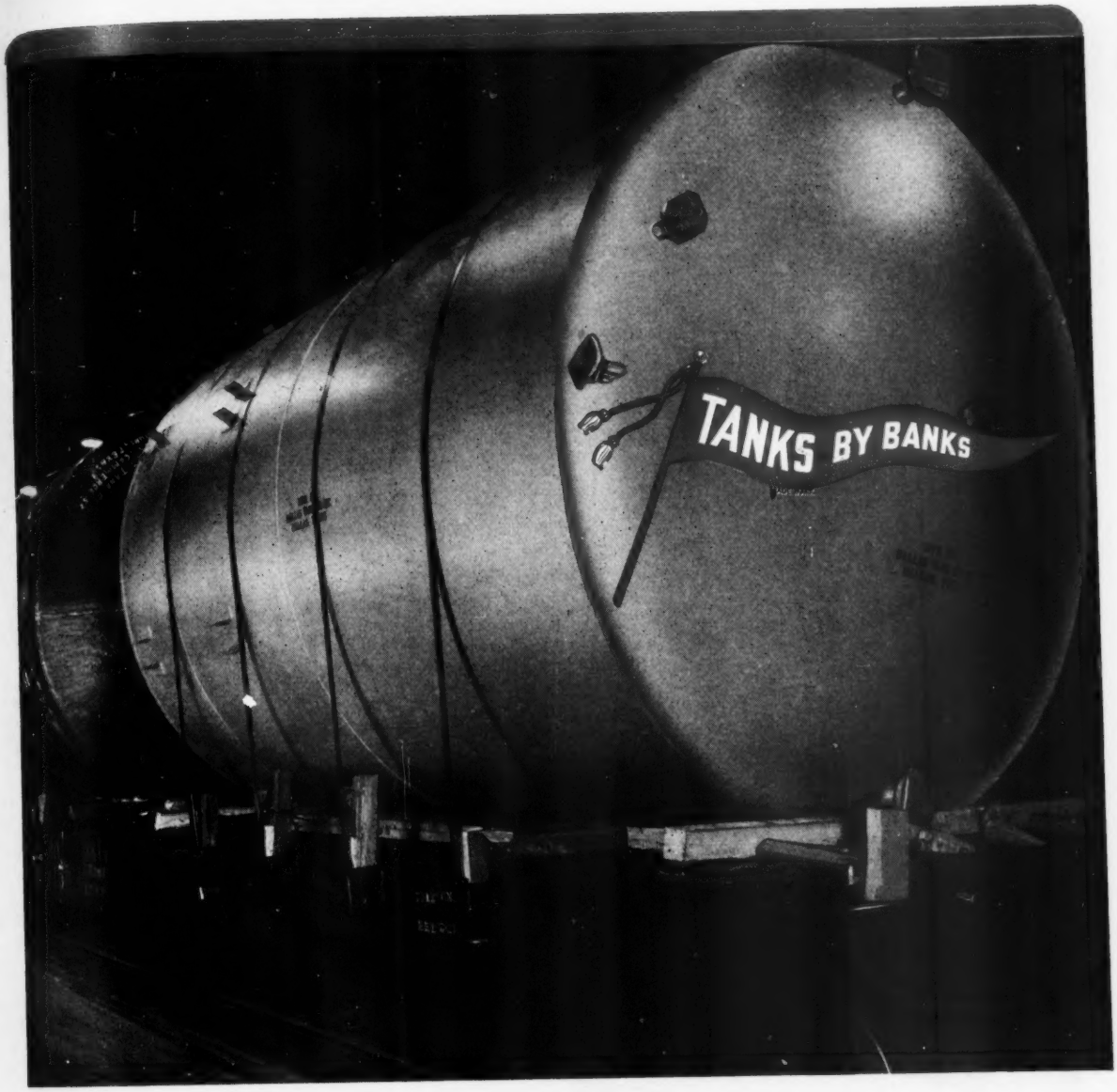


Fig. 1—Viscosity ranges for one proposed lube-oil classification system (no viscosity gaps between grades)

Fig. 2—Viscosity-temperature chart for S.A.E. 10W and proposed S.A.E. 5W crankcase oils for zero v.i. and 100 v.i. (Upham-Mougey, S.A.E., Tulsa, November 6-7, 1947)





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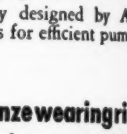

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only very small percentages of the total sales are in the heavier grades, S.A.E. 40, 50, 60, and 70 inclusive. Table 2 shows the percentages of total lubricating-oil sales by one of the largest refining-marketing companies. These proportions agree in general order of magnitude with figures developed by other companies selling oils widely over the country. *(See The Oil and Gas Journal, February 5, 1948, page 78.)*

In these figures the oil sold as S.A.E. 40 grade ranges from 14 to 21 per cent, a sizable value. The total of grades 50, 60, and 70 sold varies from 3 to 5.4 per cent, a negligible proportion. Yet, refiners point out, supplying these grades in service stations entail separate refinery blending facilities, storage and transportation containers, all increasing the supplier's costs far beyond any advantage gained by either refiner-marketer or customer.

Table 2-A shows the range of the sales by this company in the three quality grades, regular, premium, and heavy-duty, in terms of percentages of total sales.

Furthermore, only one automotive manufacturer recommended a grade as heavy as S.A.E 40 for 1947-48 cars. With the trend definitely in the direction of lighter, lower-viscosity oils for all conditions of operation, the heavier three or four grades in the old classification have become a millstone, cost-wise, around the neck of the suppliers.

Revisions Proposed

In the face of this, several revisions of the old system have been proposed and are under consideration. J. L. McCloud is chairman of special subcommittee of Technical Committee B on Lubricating Oils, A.S.T.M. D-2, which is devoted to the study of the crankcase-oil classification problem. This subcommittee recently adopted the recommendation that the present grades of S.A.E. 20 to 70 be eliminated. In place of this old system, the following new classification was recommended: S.A.E. 10-W and 20-W for winter oils; for summer oils new grades 25, 35, and 55 (the new 55 grade presumably taking in all grades heavier than the compromise 30-40 grade to be known as 35). The viscosity-temperature limits of these grades are shown in Table 3; the 5-W grade shown in this table is not included in the proposal.

Another proposal assumes that four regular grades are sufficient to enable the automotive customer to obtain the required lubricating oil for all purposes, with two special grades, one a 5-W extra-light oil, (Arctic 5-W), and the other an "Aviation 50 or 100" grade which would include all crankcase oils heavier than 40. The viscosity-temperature ranges of these proposed new grades are shown in Table 4 and Fig. 1. The proponents of this scheme point out

TABLE 2
Percentages of the total sales volume of Branded Motor Oils (Including Passenger Cars, Trucks, Buses, Tractors) in Various Grades

Premium Type

	1946	1947
S.A.E. 10/10W	11.05	11.05
S.A.E. 20/20W	27.90	27.90
S.A.E. 30	42.64	42.64
S.A.E. 40	14.42	14.42
S.A.E. 50	2.78	2.78
S.A.E. 60	1.09	1.09
S.A.E. 70	.12	.12

Regular Type

	1946	1947
S.A.E. 10/10W	4.25	4.25
S.A.E. 20/20W	22.07	22.07
S.A.E. 30	47.21	47.21
S.A.E. 40	21.18	21.18
S.A.E. 50	3.86	3.86
S.A.E. 60	1.40	1.40
S.A.E. 70	.03	.03

Heavy Duty Type

	1946	1947
S.A.E. 10/10W	3.06	3.06
S.A.E. 20/20W	20.99	20.99
S.A.E. 30	56.80	56.80
S.A.E. 40	15.95	15.95
S.A.E. 50	3.00	3.00
S.A.E. 60	.20	.20
S.A.E. 70	....	....

TABLE 2-A
Range of Percentages of Total Crankcase-Oil Classes Sold, in Three Quality Types—Regular, Premium, and Heavy Duty—1947

S.A.E. grade—	Total sales
10/10W	3.06-11.05
20/20W	20.99-27.90
30	42.64-56.80
40	14.42-21.18
50	2.78- 3.86
60	0.20- 1.40
70	0.03- 0.12

TABLE 3
Limits of New Lube-Oil Grades Proposed by Subcommittee of Technical Committee B, A.S.T.M. Committee D-2—1948 (Except the 5-W Proposed Grade)

Grade	Viscosity and temp.
5-W	6,000 S.S.U. at —20° F.
10-W	6,000-12,000 at 0° F.
20-W	12,000-48,000 at 0° F.
25	48,000 at 0° F. to 600 at 100° F.
35	600 at 100° F. to 80 at 210° F.
55	80 at 210° F. to 110 at 210° F.

TABLE 4
Viscosity Limits for Crankcase-Oil Classification (Second Proposal)

Grade—	Minimum	Maximum
Proposed Arctic:		
5	37 at 210° F.	15,000 at —30° F.
10	6,000 at 0° F.	12,000 at 0° F.
20	12,000 at 0° F.	340 at 100° F.
30	340 at 100° F.	70 at 210° F.
40	70 at 210° F.	90 at 210° F.
Proposed aviation:		
50 or 100	90 at 210° F.	105 at 210° F.

that the same S.A.E. numbers should be used, covering approximately the same viscosity ranges as in the old classification, in order not to confuse the supplier and the customer needlessly. In this proposal there are no viscosity gaps between grades. The use of gaps between the main grades was employed earlier, but is considered by most technologists now not to be desirable.

Careful study is being given by various leaders and groups to the entire problem of revision of the grade-classification system, and other proposals are to be offered in the near future. One of the strongest objections to the present classification by refining technologists is that classifying oils at two temperatures constitutes in fact a quality specification and that it thus militates against and rules out low-viscosity index oils. Since the classification is intended to grade oils only on the basis of viscosity ranges, and to refer to no other quality, many refining engineers insist that the system has been extended beyond its proper limits, and that it should not and cannot be used properly to specify v.i. properties. For the purposes for which the classification is used the designation of viscosity limits at one temperature for a given grade is sufficient, they say.

Very Light Winter Oil Grade Proposed

On still another point, automotive interests have suggested that a grade of crankcase oil lower in viscosity than 10-W be designated, for use in extremely low winter temperatures. Upham and Mougey recommended this action in November 1947 (S.A.E., Tulsa, November 6-7, 1947) to meet the needs of winter operations in Canada and the coldest parts of the United States. In the opinion of these engineers, the conventional method of diluting winter crankcase oils with kerosine is not satisfactory, especially since the diluent is vaporized rapidly when the engine has warmed up.

Tests reported by Upham and Mougey show that the lubrication is satisfactory, the consumption in summer increased by about 40 per cent when operating an engine on an oil meeting the proposed 5-W viscosity range. The opinion of some engineers is that the viscosity of 5-W oil should equal, at minus 20° F., that of 10-W oil at 0° F., that is, a minimum of 6,000 Saybolt Universal seconds at —20° F. Fig. 2 shows the comparative viscosity ranges of 5-W and 10-W oils from —25° to above 210° F., for oils of 100 v.i. and of 0 v.i. Note that the 100 v.i. oil in 5-W grade shows a higher viscosity at 210° F. than does the 0 v.i. oil in 10-W grade. This illustrates the problems involved in classifying oils of different viscosity indexes.

At the request of the Automotive Research Committee of A.P.I., with D. P. Barnard as chairman and on the recommendation of a special subcommittee headed by Ludlow Clayden, a special study group has been organized by the Cooperative Research Council, working under Co-Operative Lubrication Research (C.L.R.). This group is led by W. G. Ainsley to study the literature and data available in this field, and to determine if additional work should be carried out on the advisability of adopting a classification of the order of the proposed 5-W oil.

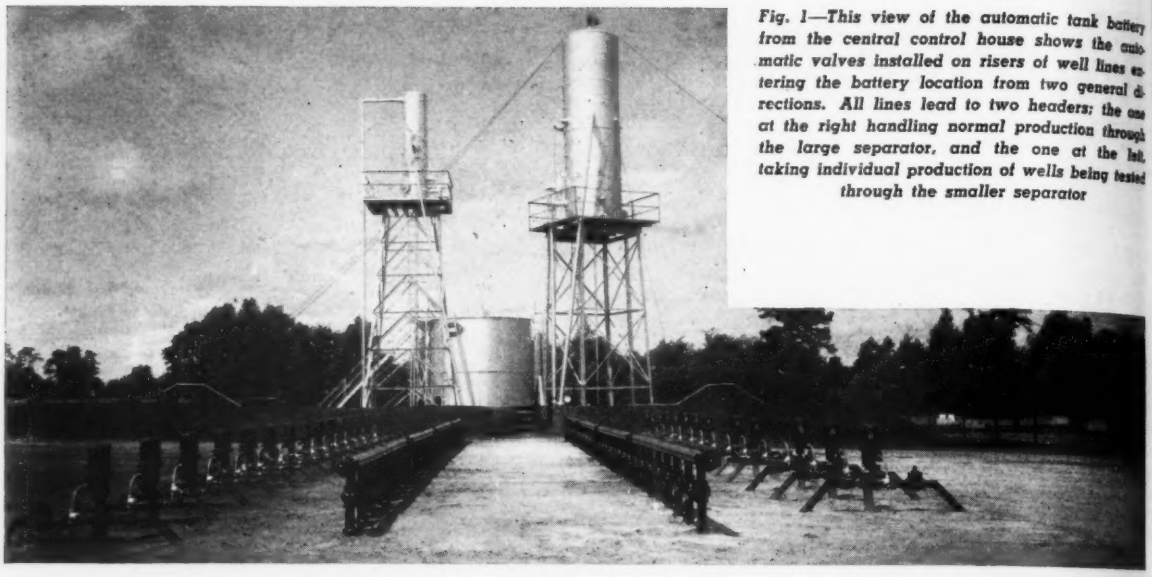


Fig. 1—This view of the automatic tank battery from the central control house shows the automatic valves installed on risers of well lines entering the battery location from two general directions. All lines lead to two headers; the one at the right handling normal production through the large separator, and the one at the left, taking individual production of wells being tested through the smaller separator

Automatic Lease Operation

by George Weber

ONE of the first adaptations of fully automatic lease control is being operated successfully by Humble Oil & Refining Co. in East Texas field. The 31 flowing wells located on the company's Coolidge lease in the field's south sector, automatically produce their individual allowables in succession on a fixed 24-hour schedule. Production is switched electrically at the five-tank battery, equipped for ground-level gaging. Numerous safety devices prevent overproduction or waste, stopping all flow in case of power or equipment failures.

All controls on the automatic lease are centralized at the tank-battery location. Well flow lines converging at that point were welded and conditioned to withstand closed-in well pressures. All wells are equipped with surface chokes which adjust their allowable flowing time to an average of 44 minutes. Wells are opened and closed at the central battery by electric-motor-driven hydraulic valves, actuated by time switches of the type often used on electrified pumping leases. Oil flow through the production separator to the 500-bbl. lease tanks is governed by tank float switches and an automatic selector which rotates tanks on the line in a fixed sequence.

Each individual well's flow line ties into the two headers through its electro-hydraulic valve located outside the tank-battery fire wall. (Fig. 1). Normal flow to the production header may be switched over manually to the test header to check the production of any selected well or wells through a smaller test separator to any selected tank without interrupting normal lease operation.

On production days, the lease's allowable flow of 642.86 bbl. begins at 2 a.m. when the first well on schedule opens and produces for 45 min-

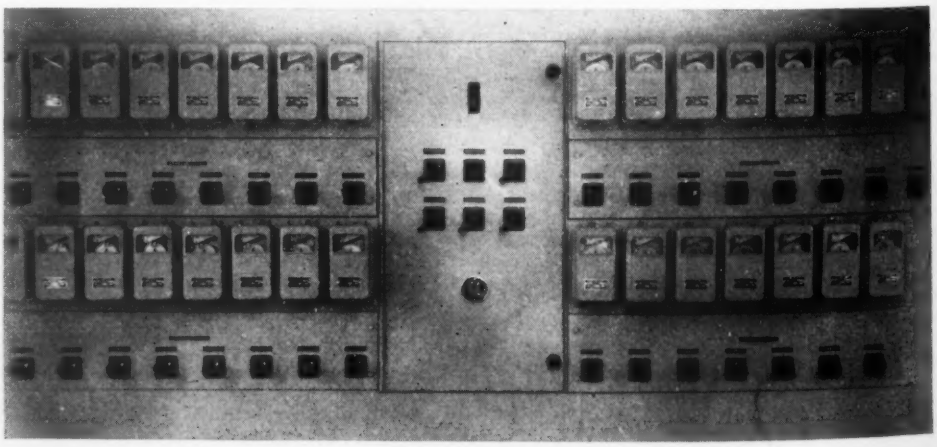
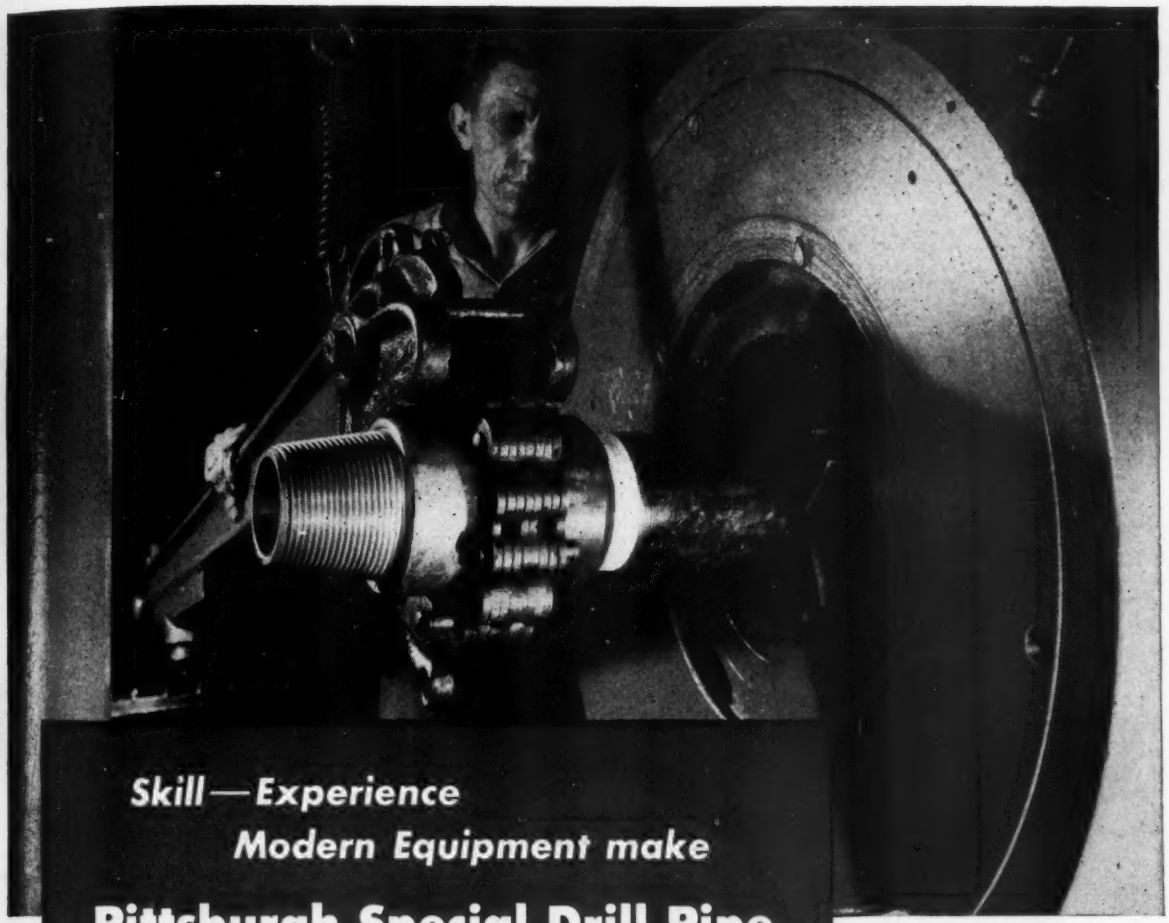


Fig. 2—This central panel in the control house mounts the master switch, the manual tank valve switches, and the sequence selector, flanked by 31 electric time switches and manual switches for all wells on the lease. The complete wiring system on the lease is explosionproof. Ample room is provided at the back of the control panel for inspection and repair



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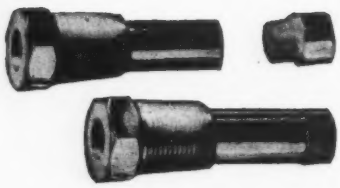

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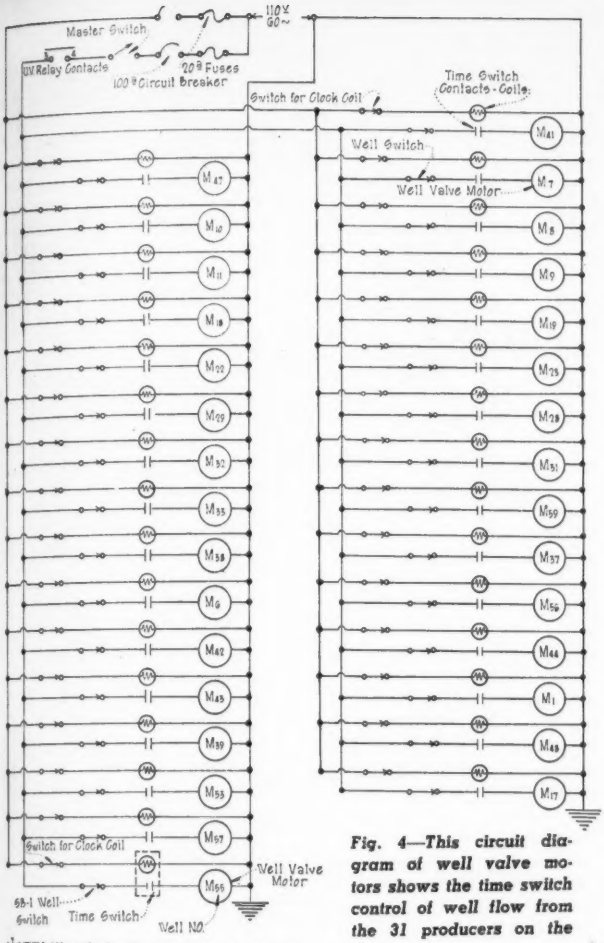


Fig. 4—This circuit diagram of well valve motors shows the time switch control of well flow from the 31 producers on the lease

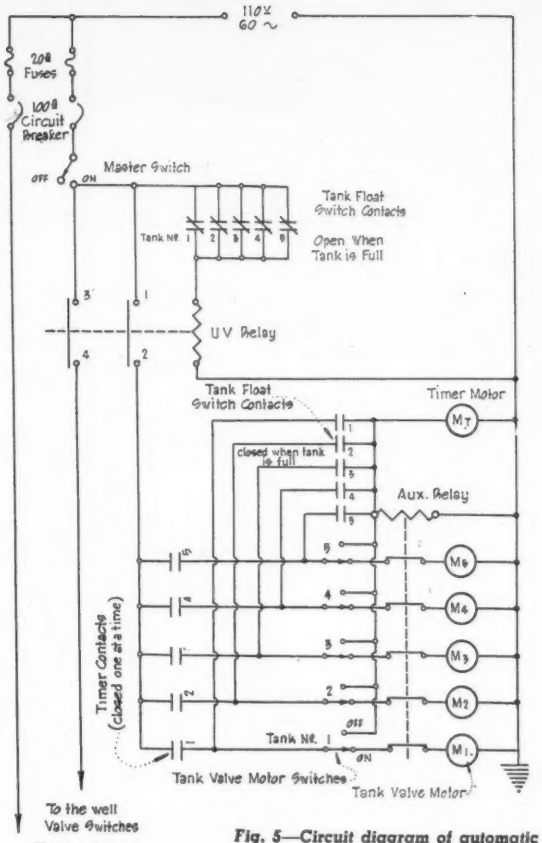


Fig. 5—Circuit diagram of automatic tank-switching system shows the under-voltage relay control circuit which stops all flow when no tank is available to take lease production. An additional safety measure, not shown, shuts down production if the oil level in the production separator reaches an abnormal height. Second stage on each of the tank-valve motor switches to be connected in series with the corresponding normally closed switch contacts is not shown

utes. Four minutes after that well is closed in, the valve on the second well's flow line opens. By 2 p.m. of the same day, 16 wells have been produced in sequence, and the lease is shut in for 45 minutes, permitting the gager to check his records before finishing his 8-hour tour. The remaining 15 wells are produced between 2:45 p.m. and 1:30 a.m. the following morning, under part-time supervision of the second lease gager who works from 6 p.m. to 2 a.m.

This particular schedule fits into the field plan for providing uniform flow of casing-head gas to the natural-gasoline plant. The controls installed on the lease would allow adjustment of flow to conform to any allowable weekly or daily flow schedule recommended by natural-gasoline-plant operators.

Time Switches

All valves and switches, of explosionproof type where necessary, use purchased electric power at 110 volts and 60 cycles. The 31 electric time switches, mounted on a panel in the central control house, govern the producing schedule of the lease. (Fig. 2). Each switch is an electric clock with a 24-hour dial which can be set to make and break a set of contacts at any predetermined time each day. In addition, each clock incorporates a 7-day dial which controls operation of the daily settings. Thus a daily schedule of flow set on the 24-hour dial can be interrupted for selected days of the week to conform to prorated days.

Each time switch operates a corresponding valve on one of the 31 well lines from the lease. Originally, thirty-one 1½-in., 2,000-

(Cont. on page 96)

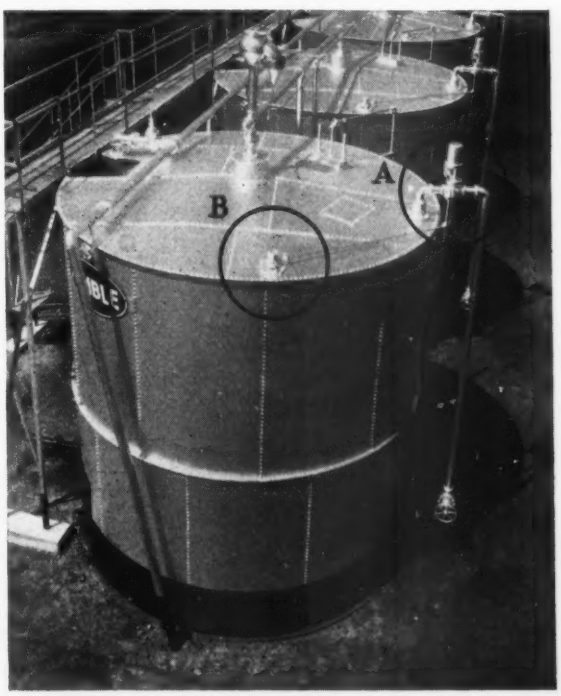


Fig. 3—Each tank riser is equipped with a 3-in. automatic valve (A) controlled by the float switch (B) and the sequence timing device mounted on the central control panel. Tanks are switched in a fixed sequence

PROBLEMS FACING *Water Flooding* IN KENTUCKY

by H. S. Barger *

A LOT of interest is being shown in water flooding in Kentucky, as well as all over the country. A statement frequently made is, "Kentucky is an ideal place for water flooding; you can's lose much money." This statement is partially true, because Kentucky is favored with shallow depths, good oil characteristics, and proximity to ready markets.

A number of conditions and factors in general contribute to a successful water flood. Some of these conditions and factors are:

1. Reservoir characteristics.
A—Porosity
B—Permeability
C—Oil saturation
D—Connate-water saturation
E—General sand conditions.
2. Oil characteristics.
3. Sand thickness.
4. Depth.
5. Acreage.
6. Water supply.
7. Development costs and problems.
8. Operating costs and problems.

An analysis of the first three factors determines the possible water-flood oil recovery. These factors can be evaluated, and reliable recovery estimates can be made for a water-flood project.

An analysis of the remaining factors determines the development and operating costs of a water-flood project. These factors can also be evaluated, and reliable cost estimates can be made for a water-flood project.

The value of the estimated water-flood oil then must be balanced against the estimated development and operating costs, before any expenditures can be justified.

We are, at present, making a study of the water-flood possibilities of a number of reservoirs in Kentucky, and I will present some of the apparent problems that we are confronted with in evaluating, developing, and operating a project in Kentucky.

General Problems in Kentucky

One of the first problems facing water-flooding operations is the evaluation of present records. These records are poor and incomplete. We have found on our own properties, as well as other properties, that we we have inadequate information of lease boundaries, well locations, elevations, drilling records, casing records, sand records, production records, and other pertinent data. In the past, we failed to recognize the value of **complete** records, and as a result, a lot of back work will be required.

Complete lease and well surveys will be required before water-flood plans can be made. This is not a big problem, but it is time consuming and fairly expensive.

Reservoir characteristics and coring.—Reliable reservoir characteristics can only be obtained from core-analysis data. Since there are very few cores in most fields, it will be necessary to core a number of wells for evaluation purposes. Effective sand thickness, porosity, permeability, and general sand conditions can be measured and evaluated from any type core. But the real problem is to obtain uncontaminated cores for oil and water saturation tests.

We believe that in most areas in Kentucky we can obtain fairly accurate water saturations from cable tool cores that are cored in oil. But the oil saturations from oil cores may or may not be representative of true reservoir conditions. We know from past water-flood experience that old reservoirs, that have been subjected to gas and air repressuring, have depleted zones and these zones may or may not show up in an oil core. Other adverse reservoir conditions, such as an expanding gas cap, and/or gravity drainage, are also hard to detect from oil cores.

A possible solution may be to core a number of wells, using different coring fluids, and check the oil saturation tests of one method against another. This will serve as a guide in "guesstimating" the true oil saturation.

Lack of knowledge of the original reservoir conditions prevents the use of oil recovery as a sole criterion for the present oil saturation.

The permeability distribution data we have to date on a number of wells indicate that we should expect initial water cuts.

Oil characteristics.—In general, the oil characteristics are fairly good over the entire state for water flooding. There are a few fields where the viscosity is rather high, but it is believed this is true mostly of the Pennsylvania sands and of the sands that have been intensively air repressured.

Sand thickness and continuity.—Very few of the original wells were cored, and the drillers called the entire section "pay." Recent coring has shown that the actual pay may be from 20 to 80 per cent of the driller's pay. Available data will have to be reviewed and a correction factor applied, using core data for the correction factor.

The effective sand thickness varies widely in each field, as well as over the entire state. Most of the oil reservoirs are closed or semiclosed stratigraphic traps, with the thick part of the sand in the middle, which is usually fairly clean. The sands usually grade into shale towards each edge, and there are some cases where the sand loses its porosity due to secondary sedimentation.

The sand continuity is questionable in a number of areas, but is also favorable in a number of areas. Local variations in sand continuity will affect the spacing program in quite a number of cases.

Depth.—The depth of the most of the Kentucky fields is fairly favorable for flooding, except in some of the shallow fields, where danger of lifting the overburden limits the operating pressure. In some shallow reservoirs of low permeability, it will be necessary to develop on a short spacing, which will materially increase development costs.

Acreage

It is highly desirable to set up a uniform spacing plan for flooding.

*Engineer, Sohio Petroleum Co., Centralia, Ill. Paper presented at recent Kentucky Oil and Gas Association meeting, Lexington, Ky.

Below 14,000 Feet

Deep Producing Record Set in South Louisiana

The deepest oil production in Louisiana has been opened by the Shell Oil company in the Weeks Island field, Iberia parish. The No. 1 Smith-State Unit, section 18-14s-7e, flowed 438 barrels of 33 gravity oil daily through an 11/64-inch choke with 2400 pounds tubing pressure and a gas-oil ratio of 1155 to 1.

THE WELL WAS drilled to 14,704 feet after setting seven-inch casing at 14,225 feet. Five-inch liner was set from 14,158 to 14,639 feet. Completion perforations were made from 14,015 to 14,018 feet; 14,022 to 14,026 feet, and from 14,030 to 14,040 feet.

This is the second well in the world to produce from below 14,000 feet. Pure Oil company's well in the Wind River Valley area, Wyoming, produces from 14,309 feet and is the world's deepest.

A NEW PAY SAND has been opened by the Sun Oil company in the South Crowley area, Acadia parish, at its No. 1 Leger, section 22-10s-1e. The well flowed through a 3/16-inch choke from 8144-56 feet. Tubing pressure was 2200 pounds.

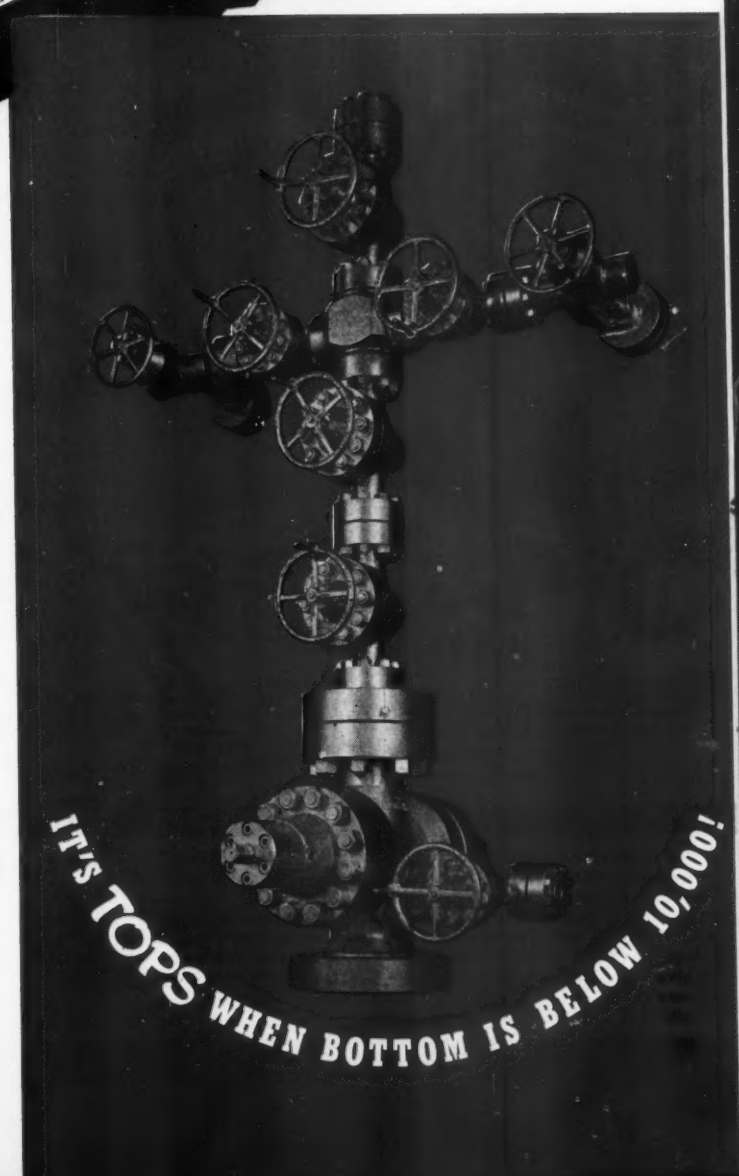
Three miles off the Cameron parish shore, Kerr-McGee has staked a 14,000-foot wildcat test in Block 33 in the Gulf of Mexico.

World Crude Output Shows Sharp Boost

World oil production totaled 3,004,424,000 barrels in 1947, the highest annual output in history. The flow was 353,719,000 barrels over [illegible] 1946 production.

DATA ON WORLD oil [illegible] are contained in the [illegible] editi[illegible]

Cameron equipment does it again!



Cameron Pressure-Operated Drilling Control Units and Cameron Safety Christmas Trees have been identified consistently with the successful drilling and completion of a majority of the notably deep, high-pressure wells drilled in the Texas-Louisiana Gulf Coast area. And now, for the third consecutive time in the same field—Weeks Island, Iberia Parish, Louisiana—a new record for deep production has been established.

Cameron Type "QRC" (Quick Ram Change) Pressure-Operated Blowout Preventers and Type "HCR" (High Closing Ratio) Flow Line Gate Valves protected the huge submersible barge rig and costly well bore every foot of the way down. A 10,000 Lb. Working Pressure Cameron Safety Christmas Tree, assembled on a Type "LD" Ram-Type Tubing Control Head and provided with two Type "E" Flow Wings, was again selected for the completion operation.

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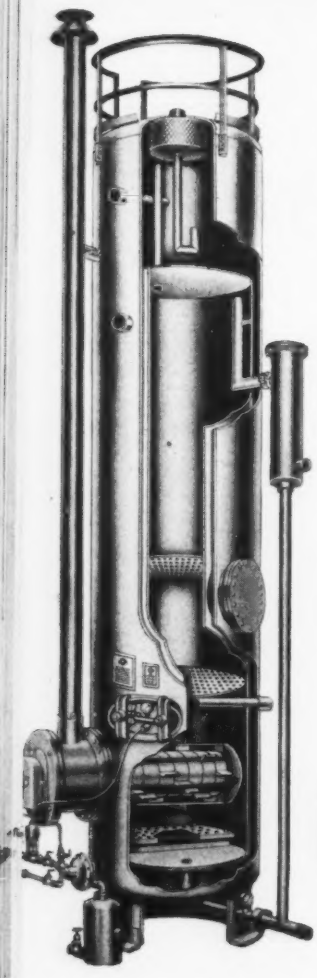

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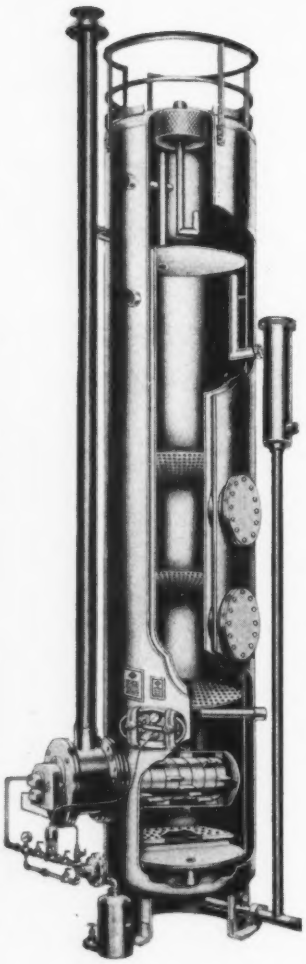
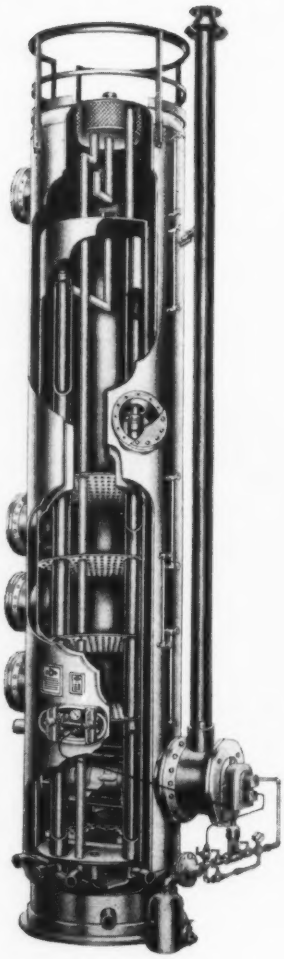
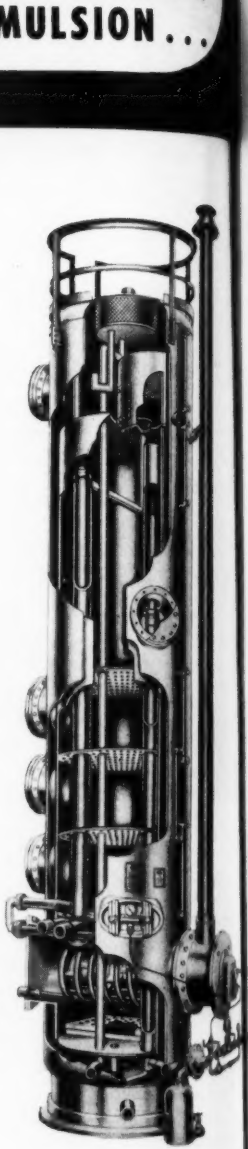


Parkersburg type ETM Emulsion Treater has been designed to treat the common oil field emulsions which require longer retention time.



Parkersburg type ETH Emulsion Treater has been designed to treat any low gravity emulsion which requires longer retention time. Especially effective in colder areas.



Parkersburg type ETF Emulsion Treater has been designed to treat any low gravity emulsion. It is especially effective in extremely cold areas and for foaming oils.

Parkersburg Treaters have been designed to effectively solve any treating problem and to reduce installation and operating costs.

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The irregular lines, small tracts, diverse ownerships, and the irregular spacing of the present wells, present an extremely difficult problem in setting up a uniform pattern. In most cases, a more uniform water-flood pattern could be set up if the royalty interests and the working interests were communitized on some equitable basis.

Water Supply and Treatment

An adequate and continuous water supply is a **must** in water flooding. The daily requirements vary so widely that it is almost useless to try to establish an average, but from observations to date, the daily requirements will vary from 50 to 125 bbl. of water per day per input well for a period of 7 to 10 years. For a flood of any size, a sizable amount of water will be required, and certainly a reasonable amount of "slack" is needed.

The problem of an adequate water supply varies widely over the state. Eastern Kentucky has a few water-bearing sands of sufficient areal extent and at reasonable depths to offer good possibilities for water supply. Western Kentucky is not nearly so fortunate, as most of the water sands are lenticular and of small areal extent. A "hole full of water" as is often recorded on drilling logs, does not mean an ample supply of water. In most cases, though, the hole will "fill to the top," the well will produce less than 500 bbl. per day. The above is true for both the fresh-water and the salt-water sands.

Deeper drilling for salt-water sands may be another possibility.

Rivers in western Kentucky offer a possible source of water supply, but the treatment costs, as well as installation costs, are going to be high.

Small floods can probably obtain their water supply from the fresh-water strata, but in time, of too much water is taken from these strata, the water supply will be exhausted.

Either fresh water or salt water can be used, but the water must be compatible to the formation and to the formation water. Many of the clays and shales that are present in oil sands, either as particles or layers, tend to swell or decompose in the presence of noncompatible waters, thereby causing plugging of the input wells. Also, there are a number of compounds that may precipitate if the waters are not compatible. A few of the constituents that often cause trouble are calcium, magnesium, manganese, iron and barium. A few of the troublesome compounds are calcium, carbonate, barium sulfate, iron hydrate, and magnesium hydrate.

We consider the problem of water supply one of the big problems in western Kentucky.

Development costs in Kentucky.—Water-flood development costs will be fairly high with an average of approximately $2,000 per acre. This average cost may seem high, but a large amount of redrilling will be required. Also, the present equipment is inadequate, which means reequipping all old wells that are used.

Another cost will be the plugging of all abandoned wells and dry holes in or near the flood area. Any unplugged well near a water flood is a possible source of trouble. When the area becomes pressured up, fluid will be lost to the upper sands or to the surface. In some areas, the cost of plugging the old and abandoned wells is a big part of the development cost. Kentucky is fortunate in that it has relatively few abandoned wells, but in some areas, unplugged wells will definitely be a problem.

There are no apparent completion problems that cannot be handled in a reasonable manner.

Operating Costs and Problems

The present indications are that the operating costs will be reasonable and will not vary too much over the state.

Our past experiences have proven that electric power, either purchased or generated, is almost a **must** for a successful water flood. Around-the-clock operation is absolutely necessary, and other types of power are not too dependable for continuous operations. In the absence of a cheap adequate fuel supply for electric generation, we believe it is highly desirable to purchase electric power. Purchased power is reasonable if it can be purchased at an average cost of 1.25 cents per k.w.h. or less.

Kentucky is handicapped at present in that there are very few three-phase power lines in or near the oil fields. REA is showing an interest in oil field loads, and there is a good possibility of their serving a number of fields.

The power requirements on a water flood are a minimum in the beginning, and the requirements gradually increase to a maximum just before beginning of abandonment. This is just the reverse of the power requirements for natural production. A water flood load has two selling points to a power company: (1) High load factor, and (2) high power factor.

BOOKS

GASEOUS FUELS—A DIGEST OF THEIR PROPERTIES, BEHAVIOR, AND UTILIZATION. Edited by Louis Shnidman. Published by American Gas Association, 420 Lexington Avenue, New York. 368 pp.

This volume, prepared under auspices of the subcommittee of the Chemical Committee, Technical Section, A.G.A., is a natural successor to "Fuel-Flue Gases," which was published in 1940. It should prove useful as a reference, not only to technical and scientific men, executives or managers in the gas and related industries, but to technically minded students in colleges and universities. It includes discussions of recent developments and problems of the industry, and provides a comprehensive study of the properties, behavior, and utilization of fuel gases.

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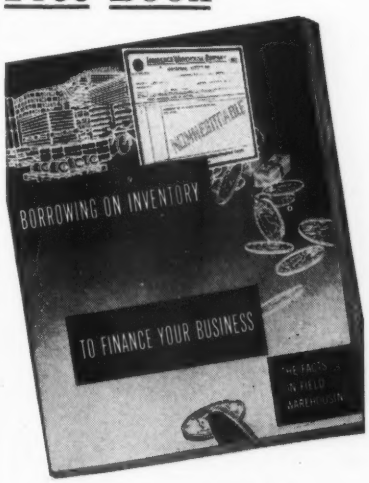

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A Report on

New Gas Developments in Southern West Virginia

by E. H. Tollefson,* W. H. Mayfield,* and A. R. McCamey*

THE area under consideration comprises Wyoming and McDowell counties and adjoining sections of Raleigh, Boone, and Logan counties in West Virginia, and Buchanan County, in Virginia (see Fig. 1). Proven reserves and present rates of withdrawals are sufficient to place significance on this area as a major gas discovery. Although large sections remain untested, it is well established as one of the largest shallow gas supplies discovered in the Appalachian province during the past two decades.

In this area of approximately 2,000 sq. miles, very little drilling for oil and gas had been done prior to 1943, mainly, because of the excessive development costs and lack of adequate pipe-line outlets to markets. As of May 1, 1948, approximately 278 wells had been drilled throughout the region; of this total 40 were abandoned as dry holes, giving a dry-hole percentage of 14.4. Many of the so-called dry holes produced gas in small quantities, some of which would have been retained as commercial wells if pipe-line outlets had been available at the time of completion of these wells.

There are many reasons for delay in drilling the region for oil and gas prior to 1943. The important ones are:

1. High drilling cost due to the predominance of hard, abrasive sandstones with intervening cavy shale beds.

2. Priority of coal and additional precautionary measures required for the protection of coal seams.

3. Comparatively high construction cost because of the rough terrain.

4. Prior to 1944 gathering lines and transmission systems to larger markets were not justified for the low-volume wells.

5. Before World War II, the ample supply of gas available at established rates discouraged major producers from inaugurating an exploratory program with uncertain results.

Rugged topography is the primary factor that materially affects development costs, particularly road building and pipe-line construction. Streams have cut their channels through the strata in such a way as to form sharp, narrow ridges and deep, V-shaped valleys.

Ridges and hill summits range from 900 to 1,200 ft. above the floors of the valleys, while the maximum variation in surface elevation over the whole area ranges from 827 ft. above sea level on Tug River to 3,536 ft. above the same datum on Flat Top Mountain, a vertical relief of more than 2,700 ft.

Surface formations consist mainly of the famous coal-bearing groups: Kanawha, New River, and Pocahontas of the Pottsville series of Pennsylvanian age. Outcropping formations are composed mainly of massive, hard, cliff-forming sandstones with slight interruptions in the steep slope of the mountain sides resulting from outcrops of thin soft shales and coal seams which separate the great sandstone ledges.

This area covers one of the richest coal districts in the nation, where the "smokeless" New River and Pocahontas coals have attained maximum development in thickness, purity, and number of workable seams. These coals are low in percentage of impurities and high in heat values, making them in great demand for general fuel purposes. Throughout the entire area some coal beds are present in sufficient thicknesses and regularity to warrant commercial mining operations. Consequently the intrinsic value of coal had been established long before the advent of gas developments.

Coal Considerations Vs. Oil

Ordinary delay rental rates per acre as offered by gas interests were not comparable to the value placed on an acre of coal and in some cases coal operators placed only a nuisance value on gas operations. This led to some unusual lease stipulations for the gas interest, in that coal is the dominant estate, that oil and gas interests are subservient thereto, and that gas operations are conducted in such a way as not to interfere with necessary requirements of any coal operations which may be projected upon the premises. As a result of this situation, it is necessary for the gas operators to use extra precautionary measures to prevent any evidence that might be construed as negligence in protection for present and future coal-mining operations.

Eight New Fields—Nine Horizons

Eight separate gas fields have been discovered to date (see map). Due to the relatively slow completion rates, none of the fields have been definitely defined by dry holes. Gas in commercial quantities has been produced from nine different geological horizons, most of which are of Mississippian age, with some gas shows in the Pennsylvanian and Devonian. This is termed shallow production, since production is at a lesser depth than 4,000 ft. from the surface and most of the formations are well known in other producing sections of West Virginia.

Chemical analysis of the gas indicates an average composition of 97 per cent methane, 2 per cent ethane, and 1 per cent inerts, with a calculated heat value of 1,020 B.t.u. per dry cubic foot. This is an exceedingly dry gas, substantiated by the almost total absence of oil and gasoline.

Probably the most significant fact in the discovery of commercial gas in this region is that the scope of potential shallow production for future drilling is increased throughout parts of West Virginia and Virginia. These fields are considerably south and east of the older shallow production and are located in closer proximity to the Allegheny Mountain front. When compared with similar, almost untested sections, potentialities for additional shallow production are increased over wide areas.

History of Developments

First gas developments in this region began in 1919, when Ravencliff Development Co., on the Wyoming Pocahontas Coal Co. lease, encountered gas in the Ravencliff sand at a depth of 1,550 ft. The gas pool developed on this lease was not impressive in size or deliverability and for this reason further drilling was discouraged at that time. In 1930-31 two small wells were completed by Ritter Lumber Co. on its properties south of Pineville. In 1932 Penn-Ohio Co. completed the first test ever drilled in McDowell County for oil and gas. The hole penetrated the Oriskany sandstone, which was dry, and was abandoned with 200 M.c.f. of gas in the Berea sand. In 1942

*Hope Natural Gas Co., Clarksburg, W. Va.
A paper presented at the spring meeting of the Eastern District A.P.I., Division of Production, at White Sulphur Springs, W. Va.

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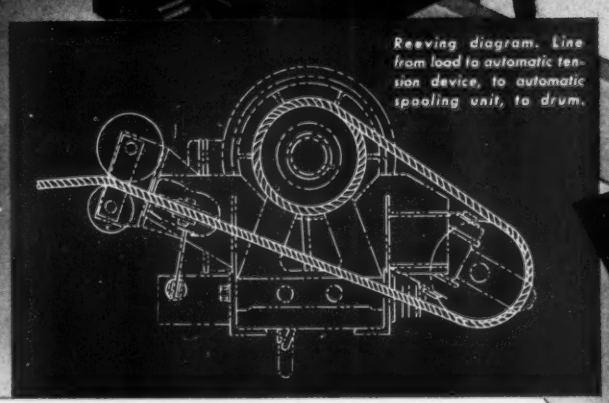

Reeving diagram. Line from load to automatic tension device, to automatic spooling unit, to drum.

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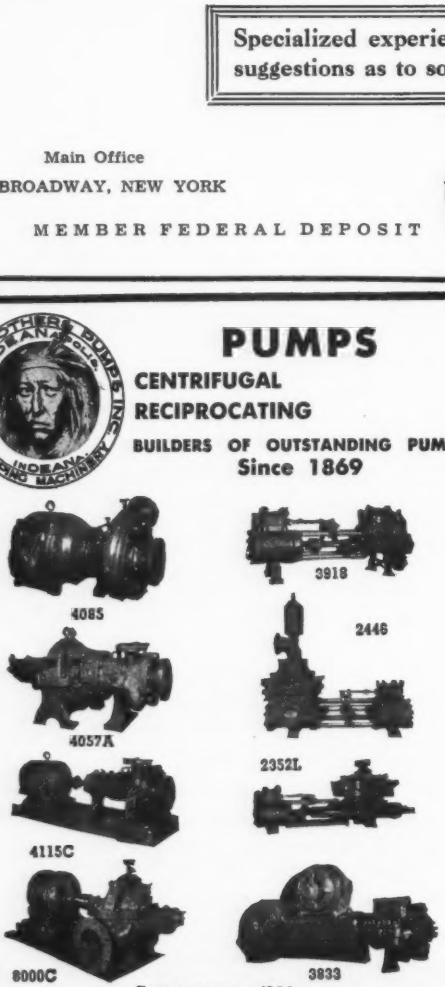

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NORTHWESTERN *Refining Co.*

SAINT PAUL PARK, MINN.

Godfrey L. Cabot, Inc., discovered a small field near Pineville.

It was not until 1944 that wells of sufficient volume and rock pressure were brought in to excite new interest in the region. The most prolific gas pool discovered in the area to date is Berea sand pool on Indian Creek. Godfrey L. Cabot, Inc., on the Hunter Ford, with a volume of 2,500 M.c.f. and a reservoir pressure of 800 psi., was the discovery well. This, in conjunction with the diminishing gas supplies and the increasing war demands in the Appalachian area, was ample incentive for other producers to enter the area, even in face of excessive drilling and transmission costs.

The indefinite pool limits (see map and table) result from multiple sand production and from extending production to low-volume wells which were assumed to be edge wells. Considerable drilling remains to define field limits as well as exploratory drilling on large sections of the untested leases.

There are some isolated wells where offset drilling will probably result in new fields or an extension of a known pool. One of the better examples is the first productive well in Buchanan County, Virginia, drilled recently by United Producing Co. and known as V-1 Ritter Lumber Co. This well tested 17,000 M.c.f. from the Ravencliff sand, with 665 psi. reservoir pressure, and is the only productive well completed to date in this pool.

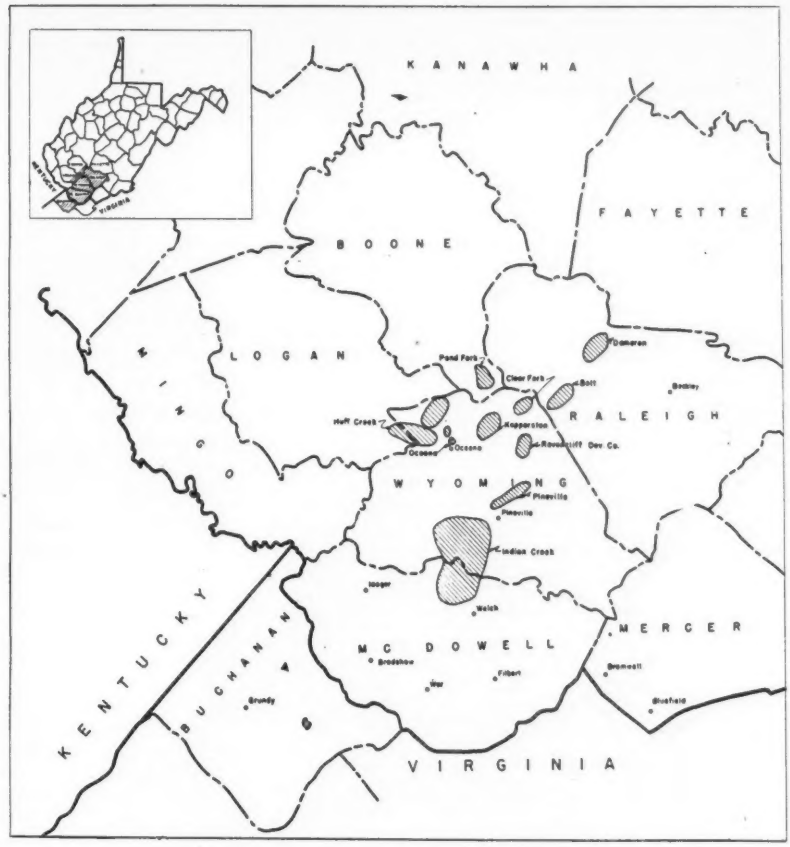


Fig. 1—New gas fields in southern West Virginia and Virginia

Estimated Reserves

A developed reserve of about 95 billion cubic feet on 32,000 acres for 238 producing wells is calculated by allocating productive acreage to each well. This is a very conservative estimate in that only wells completed to date are used, and does not assume acreage productive beyond a certain distance from a well. But by outlining productive areas with limits established by dry holes and low-volume wells, a proven reserve is estimated to be about 200 billion cubic feet from 71,000 acres. Difference between proven and developed reserves is indicative of future drilling necessary to complete the established fields. Gas withdrawals to date are approximately 37 billion cubic feet. The reserve figures are substantiated in part by the delivery decline resulting from these withdrawals. About 30 billion cubic feet of the total deliveries has been affected since October 1946.

Drilling and Operating Conditions

Many of the wells have been drilled with modern-type spudders. Some of the advantages of operating spudders in this region are listed as follows:

1. Over-all saving in labor and teaming costs, and increased number of completions per drilling unit.
2. By using the regular drilling crews for this work, shutdown time for rig and crews between locations is decreased, which tends to eliminate personnel problems because of irregular employment for the crews.
3. The complete elimination of costly rig building by importing outside labor.
4. Mechanical advantages in drilling with spudder.

The danger of loss of life, equipment, and production when drilling in larger volume wells with spudders is a factor that must be considered with forethought. The hazards are somewhat reduced by using drill-

GENERAL INFORMATION ON THE FIELDS SHOWN ON MAP

Field—	Productive formations	Approximate depth	Reservoir pressure, psi.	Average volume, M.c.f.
Indian Creek	Ravencliff	1,200	390	150
	Maxon (upper and lower)	2,000	500	970
	Big Lime	2,600	570	80
	Berea	3,400	820	2,300
Pineville	Ravencliff	1,500	400	240
	Big Lime	2,600	690	300
Kopperston	Ravencliff	1,700	440	570
Oceana	Ravencliff	1,600	530	2,200 (1 well)
	Maxon (middle)	2,000	645	3,600 (1 well)
	Berea	3,500	800	250
Ruff Creek	Maxon (upper)	1,900	705	6,600
	Big Lime	2,500	760	530
	Berea	3,200	830	800
Pond Fork	Maxon (upper)	2,800	635	1,500
Bolt-Clear Fork	Ravencliff	1,800	310	770
	Maxon (middle)	2,000	520	800
	Big Lime	2,900	600	140
Dameron	Ravencliff	1,900	430	2,000
	Maxon (lower)	2,400	550	780
	Big Lime	2,600	725	230
	Weir	3,200	385	310

The average volume capacity shown per well does not include dry holes. These data are for field results as of May 1, 1948, but are incomplete as drilling continues in each of the listed fields.

ing-in heads with bleedoff lines, extending motor exhaust pipe away from well, using water spray in the motor exhaust and using a deflector shield at the well mouth.

Data are presented for 79 wells completed with a total footage of 244,476 ft. in 10,103 drilling days, or an average footage of 24.2 ft. per day. Long fishing jobs and caving formations account for a part of the low daily footage average but most of it can be attributed to the extremely hard formations encountered in drilling. As evidence of the extreme hardness of the formations, it should be pointed out that it is often necessary to dress as many as nine bits per tour in both the 10 and 8-in. hole.

Following are statistics for 79 wells with the maximum and minimum daily rates of penetration to designated formations:

No. wells	Formation	Average daily rates of penetration Max.-ft.	Min.-ft.	Ave.-ft.
12	Princeton and Ravencliff	41.6	10.2	22.4
15	Maxon	40.9	15.0	28.5
11	Big lime and Weir	31.3	16.4	24.5
41	Berea	38.2	9.9	23.6

Average elapsed time for drilling to the various formations is as follows:

No. wells	Formation	Average depth (ft.)	Average elapsed time (days)
12	Princeton and Ravencliff	1,838	82
15	Maxon	2,515	90
11	Big lime and Weir	3,149	128
41	Berea	3,660	155

Standard drilling equipment is used throughout the area with the exception of spudders, swivel sockets, and alloy-steel bits. The wells are drilled with wire lines direct and swivel sockets when using spudders.

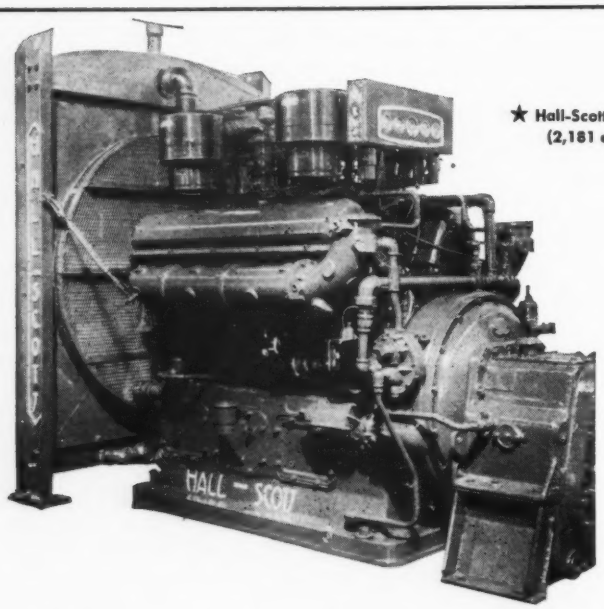
Although there are several cavy sections of hole, the most difficult to drill is found directly above the Ravencliff sand. When this cave is encountered, the most common practice is to drill as far as possible, cement the hole solid and redrill. In some cases it is necessary to cement the caves as the formation is drilled as some holes have been lost due to this cave. Some operators have been successful in using chemical compounds or fluids to prevent caving.

Water does not give a great deal of trouble in drilling in this area if sufficient outside casing is run at the top of the hole to shut off all surface water. In some sections water is encountered in the Maxon sand. Generally this water can be carried and the 7-in. casing landed in the Big lime without serious difficulty. But if the water causes a caving hole between the Maxon sand and the Big lime, it then is necessary to cement the cave before the 7-in. casing can be landed.

The hardness of the formations in the area makes necessary the frequent and careful dressing of bits. Many bit pins have been knocked off, resulting in long fishing jobs or loss of the hole. In an effort to minimize the loss of time and equipment resulting from the above-described failure and to improve the cutting and wearing surfaces of the steel, alloy-steel bits were tried for this type of drilling and have proved very satisfactory. In one instance a contractor used one set of 8-in. bits in drilling 3,600 ft. of hole and these bits were still in a condition to drill that much more hole. Up to the present time, there have been no reports of knocking pins off this type of bit in this area. Alloy bits are priced at approximately twice that of ordinary bits but most contractors consider them worth the price, particularly in the larger sizes.

Alloy-steel bits when run in very hard abrasive sandstone, do not flatten under impact or wear from abrasion as rapidly as the regular-type bits. The rate of penetration for any one run is not increased to a great extent with an alloy bit but the time of the run is increased about 30 per cent. This allows more footage for the bit and minimizes bit dressing.

Alloy bits should be heated to a



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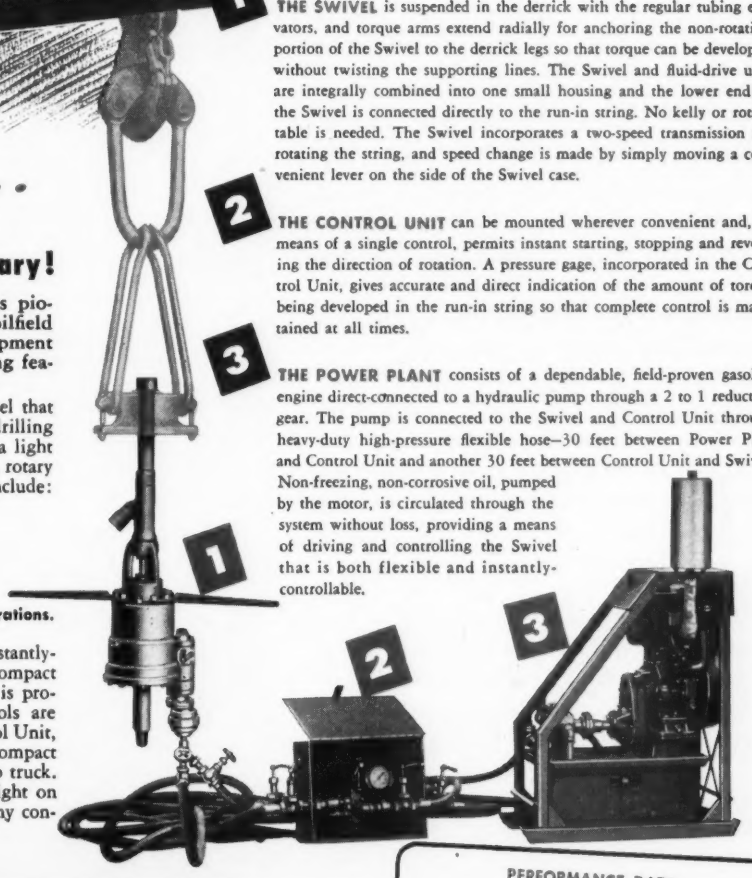
This unit consists of a fluid-driven Swivel that can be suspended in the rig—*any* rig, whether drilling or producing—to provide a means of rotating a light string of tools without need for installing kelly, rotary table or other heavy equipment. Applications include:

- **Internal cutting and fishing jobs**
- **Drilling out bridges**
- **Scraping liners**
- **Drilling out cement in tubing**

... and other similar operations.

The Swivel is driven by positive, instantly-controlled hydraulic pressure generated by a compact Power Unit, and continuous finger-tip control is provided by a Control Unit in which all controls are centralized. The entire assembly—Swivel, Control Unit, Power Plant and connecting equipment—is so compact it can be readily transported in a small pick-up truck. And if desired, the Power Plant can be left right on the truck for quick jobs—or can be set off at any convenient place on or near the rig.



1 **THE SWIVEL** is suspended in the derrick with the regular tubing elevators, and torque arms extend radially for anchoring the non-rotating portion of the Swivel to the derrick legs so that torque can be developed without twisting the supporting lines. The Swivel and fluid-drive unit are integrally combined into one small housing and the lower end of the Swivel is connected directly to the run-in string. No kelly or rotary table is needed. The Swivel incorporates a two-speed transmission for rotating the string, and speed change is made by simply moving a convenient lever on the side of the Swivel case.

2 **THE CONTROL UNIT** can be mounted wherever convenient and, by means of a single control, permits instant starting, stopping and reversing the direction of rotation. A pressure gage, incorporated in the Control Unit, gives accurate and direct indication of the amount of torque being developed in the run-in string so that complete control is maintained at all times.

3 **THE POWER PLANT** consists of a dependable, field-proven gasoline engine direct-connected to a hydraulic pump through a 2 to 1 reduction gear. The pump is connected to the Swivel and Control Unit through heavy-duty high-pressure flexible hose—30 feet between Power Plant and Control Unit and another 30 feet between Control Unit and Swivel. Non-freezing, non-corrosive oil, pumped by the motor, is circulated through the system without loss, providing a means of driving and controlling the Swivel that is both flexible and instantly-controllable.

PERFORMANCE DATA

Swivel Speed
Capacity—80,000 lbs. Tensile Loading.
Model "F", 17 RPM—constant—low speed
34 RPM—constant—high speed
Model "FV", 1 to 17 RPM—variable—low speed.
1 to 34 RPM—variable—high speed.

Torque.
Maximum—both models . . . 15,000 inch-lbs.
Elevator Neck—2⅞" O.D.
Lower Stem Joint—2⅜" API Regular Pin.
Goose Neck—2" API Line Pipe (female thread).

Power Unit
4 cycle gasoline engine, 9.2 h.p. at 2200 RPM, geared 2 to 1 reduction.
Magneto, spark plugs and wiring all spark-proof—exhaust protected with spark arrestor.
Pump equipped with safety valve for 1000 p.s.i. maximum pressure.
Sump Capacity—20 U. S. gallons.

TWO TYPES...MANY APPLICATIONS

To meet the various requirements of different operators, the Baash-Ross Power Swivel is available in two types . . .

1. **MODEL "F" which provides a choice of two rotating speeds as indicated at right, and in each speed both the torque and RPM remain practically constant at all times.**
2. **MODEL "FV" which provides two speed ranges, and in each range both the torque and RPM are variable between wide limits as indicated at right.**

Since the Power Swivel requires no drawworks or other heavy equipment that is complicated and costly to install, it is ideal for many light rotating jobs—for drilling out cement plugs and sand bridges, for scraping paraffine, for rotating internal cutters, etc.

On cutting jobs its smooth, sensitive, easily-controlled hydraulic drive is far superior to the irregularities and uneven feed of manual rotation. It is also safer because there is no need for workmen to be near the stretched pipe while it is being cut . . . nor for them to work on makeshift platforms. The Power Swivel can be operated at any height in the rig, eliminating need for cutting off the run-in string at floor level.

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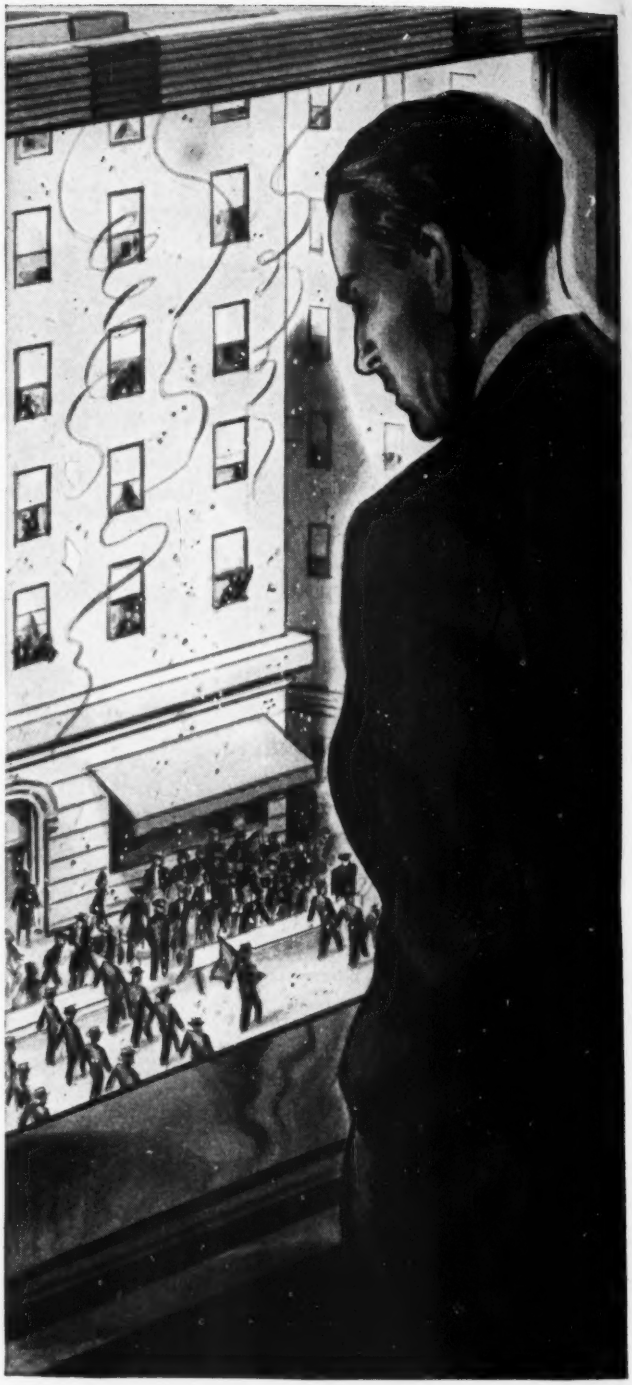

HERE'S ONE parade that isn't "all over but the shouting" after the band has passed. It's the Payroll Savings Plan for the regular purchase of U. S. Security Bonds by employees.

Though the formal spring campaign to sell Bonds is over, any company can still move forward with the parade. Right now thousands of companies are putting *additional push* behind their Payroll Savings Plans. Managements of many companies that have not yet participated are *now installing* the Plan.

It's a "look-ahead" plan, that benefits employee, company, and nation. Every $3 invested in Bonds pay $4 at maturity. Personnel records in the plants with active P. S. P. programs show improved employee attitudes—evidenced by less absenteeism and fewer accidents—as the individual's sense of security grows with Bond purchases. And every Security Bond dollar built up in the Treasury retires a dollar of the national debt that is potentially inflationary. It means less bidding-up of prices. Moreover, Bond buyers are better citizens because they have a tangible stake in the nation's future.

It's just as easy to take action now as when the campaign was at its height. Just call your Treasury Department's State Director, Savings Bonds Division, and ask for the material that helps to get a Payroll Plan started or to keep it rolling.

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cherry red and dressed from 1/8 to 1/4 in. smaller than the bit gage as there is a slight expansion when this type of steel cools. When reheating to temper, the bits should be brought to a dull red, immersed in the slack tub until normal color, and then removed from the water and allowed to finish cooling in the air.

Shooting and Acidization

Satisfactory results have been obtained from all producing formations by shooting with nitroglycerin. In one area of Berea sand production, wells with initial open flows of 25 to 150 M.c.f. were shot with 40 to 60 qt. of nitroglycerin which resulted in flows from 900 to 1,250 M.c.f. and after a year of steady production have an open flow of 500 to 700 M.c.f.

Shot results from the various producing formations follow:

No. wells	Formation	Average open flow per well: Before shot (M.c.f.)	Average open flow per well: After shot (M.c.f.)	Percentage increase
17	Princeton and Ravencliff	323	692	114.2
11	Maxon	404	987	144.3
6	Big lime	131	174	32.9
5	Big lime (acidized)	116	459	296.0
14	Berea	192	657	243.1
53		264	663	152.2

In some wells acid treatments have been followed with gasoline or very light crude oil and in other wells the tubing has been purged with water after acidizing. Limited experience with acidizing in this area prevents any definite conclusion as to the best procedure. Like other Big lime producing areas in the state, some wells take the acid readily, while in other wells it must be forced in under pressure.

Some difficulty has been experienced in the larger-volume Berea wells by condensation, which forms on the casing wall. This accumulates and gradually finds its way to the bottom resulting in a head of fluid that vibrates up and down the hole as gas feeds from the well. This action washes the exposed section of the hole causing sand and shale to pack at the bottom which eventually reduces the well's delivery. This does not permanently damage the well but necessitates a cleaning-out job. The plan at the present time is to run a composition liner with a cave catcher set at the top of the Berea sand. These liners are drillable or can be chemically removed if necessary.

General Stratigraphy and Reservoir Conditions

Underlying the Pottsville series, which has been previously described, is the Mauch Chunk series of the Mississippian age. The series is composed of red and green shales and siltstone with several sands and limestones. Containing four producing formations in the area, Ravencliff, upper Maxon, Maxon, and lower Maxon, the beds thicken

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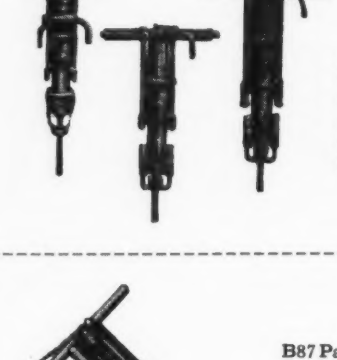
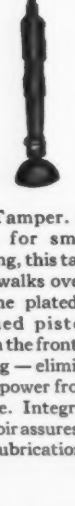


No matter what the type of ground, there's a Gardner-Denver Sinker that is "right." Shown from left to right are the S33, the S45 and the S55—part of a complete line of Sinkers available for every need.



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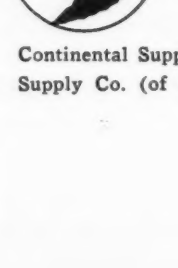

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from 950 ft. in southern Boone County to 2,100 ft. at the state line.

Ravencliff is described as a white, fine-to-medium, occasionally conglomerate sandstone, varying in thickness from a few feet in Boone County to 200 ft. at the Virginia-West Virginia line. At first it was assumed this horizon was one of the salt sands which were productive in other sections of West Virginia, but it has been definitely established by correlation that the Ravencliff is in the Mauch Chunk series, wedging out to the north and west.

The stratum is developed in some form throughout the area, but varies in thickness. There is some evidence that Ravencliff production may follow a general trend as established by sand thickness, but the production is so erratic that the idea remains a point of conjecture. Reservoirs have been void of water, without evidence of fluid encroachment of any type. Accumulation has been controlled by stratigraphical conditions, while trapping has been governed by lenticularity of the sand. The largest well to date in the Ravencliff is the V-1 Ritter Lumber Co., in Buchanan County, Virginia, testing 17,000 M.c.f. with 665 psi. reservoir pressure.

The upper Maxon is a white, fine-to-coarse-grained sandstone, varying in thickness from zero to 140 ft. Lenticularity of this formation is one of the most interesting stratigraphic conditions in the area. One of the largest-volume wells drilled to date, United Producing Co. 7 Pardee, made 19,000 M.c.f. initial open flow. Here the sand has attained a thickness of 137 ft. with a maximum pay thickness of 40 ft., but in a lateral distance of 6,000 ft. the sand thins to 5 ft. Conditions of this type emphasize the importance of stratigraphic analysis and reservoir conditions, and places structural factors in a secondary category.

The most persistent of the Mauch Chunk horizons is the Maxon (middle), described as a gray, fine-to-medium sandstone. This sand is more extensive, being productive in other sections of the state. One major field has been developed in this sand at Bolt, Raleigh County; reservoir pressure was 525 psi. and maximum volume 2,000 M.c.f.

The lower Maxon is similar to the upper Maxon in composition, attaining greater thickness to the southeast. A small field, Dameron, Raleigh County, is in the process of development. Erratic results indicate poor pooling effect, probably due to the lenticularity of the sand.

The Greenbrier limestone (Big lime) is a brown-to-gray, fossiliferous limestone varying in thickness from 200 ft. in Boone County to 750 ft. at the state line. It contains several dolomitic and oolitic zones that are quite variable in development, which probably account for the irregular production from this stratum. The results of shooting and acidizing of the Big lime are inconsistent. However, practically all wells drilled through the Big lime have encountered gas, mainly low in volume but ever present. Because of this condition, the Big lime remains as a potential producing formation for future development. The base of the Greenbrier is one of the most reliable key markers for purpose of correlation, particularly when the red shales and siltstones of the Maccrady are found directly below. The Big lime is the only horizon in the entire area that produces wet gas. Some wells have produced sufficient natural gasoline to require extra drips.

The Pocono series (lower Mississippian) including the red Maccrady shales, siltstones, and lenticular sandstones, attains a maximum thickness of 700 ft. The base of the Pocono is marked by the most productive formation developed to date, the Berea sand, which has a maximum thickness of 40 ft. It is well defined by the persistent brown to black Sunbury shale (Coffee shale) immediately overlying the sand. Where it is present, the Berea is described as fine-to-medium, gray-to-white, and usually conglomeratic. The horizon thins to the east and south, probably a gradational change from sandstone to siltstone which influences both trapping and accumulation. The largest Berea field to date is Indian Creek and is of sufficient areal extent, 14,000 acres, plus a large downdip water-bearing area to indicate regional porosity and for this reason considerable interest continues in drilling for prospective Berea pools south of Indian Creek field.

The Mauch Chunk, Greenbrier, and Pocono series all thicken cumulatively to the southeast. The regional rate of thickening is sufficient in many sections to make the surface structure disconformable with the subsurface.

In general, accumulation in the Mauch Chunk and Greenbrier is due to favorable stratigraphic conditions. Although there are three major structural folds (Pineville, Mullens, and Dry Fork anticlines), their influence on accumulation is secondary to stratigraphic control. In some cases the rate of thickening and thinning of the Mauch Chunk sands exceeds the regional dip developing local structural conditions to the extent of affording sufficient vertical relief for effective gravitational separation of gas from reservoir fluids.

The regional pinchout of the Berea sand to the east and south is thought to be the primary control for trapping, as all Berea reservoirs discovered to date are related to this thinning. Particularly is this true of the smaller Berea fields in the northern part of the region where accumulation is influenced by favorable stratigraphic conditions. In the Indian Creek field and part of McDowell County regional porosity and permeability is indicated over a large area by past drilling results. This condition allows structural folding to be a primary factor in gas accumulation, while trapping is caused by a regional pinchout of the sand, a gradational change from sandstone to siltstone.

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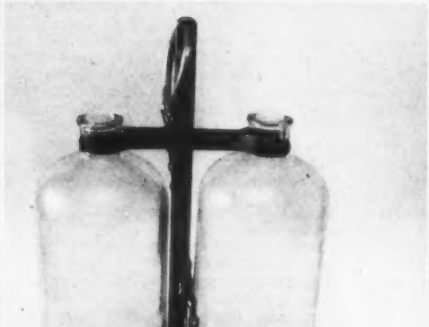

Many variations in the design of the sampling bottle basket are possible. The one shown here handles a standard quart bottle

PLANT PRACTICES

Sampling Storage Tanks, Agitators and Similar Refinery Equipment

IN refinery practice, considerable time is lost in lowering and lifting various devices employed in the sampling of storage tanks, agitators, or similar vessels. If more than one sample must be withdrawn, the time may be shortened considerably by employing a specially designed basket or tray which is capable of holding one or more of the sampling devices. Many variations in the design of the basket are possible, depending upon the size and shape of the samplers. A satisfactory arrangement for the handling of standard quart bottles is shown in the attached photographs.

Each bottle can be opened independently by means of strings attached to the stoppers, thus securing samples of liquid from the desired tank levels. The basket serves also as the weight required to lower the empty bottles into the tank. This eliminates the necessity of attaching improvised weights to individual bottles, which are easily lost, and often cause damage to the pumping equipment.

The basket is permanently attached to the tank or agitator by means of a metal chain. A pulley or a small shelf, protruding inside the tank, of sufficient size to accommodate the basket, facilitates the use of this device.

This idea was developed by A. W. Henry, of the technical department, refining division of Magnolia Petroleum Co., Beaumont, Tex.

Portable, Power-Driven Sand Screen Proves Useful

THE power unit shown here installed for driving a small rotary sand screen employs discarded truck parts which serve as a speed reducer and changer. Mounted on a weld-fabricated base comprised of steel plates and structural sections, the unit has proved useful on construction jobs.

The output shaft is one of the axles of the differential assembly of a small truck. Other than shortening one of the axle housings, anchoring a differential spider, and providing an outboard radial-thrust bearing on the output shaft, no changes were made in the truck's "rear end" assembly. Any type of drive suitable for torque conditions may be employed.

A V-belt sheave is attached to the input shaft of the truck transmission which in turn is connected via a flexible coupling to the input shaft of the altered differential assembly. No changes were made to the driving sheave on the gasoline motor since the motor was equipped originally with the proper size and type V-belt for transmitting its maximum torque output.

The transmission used in building this power unit is of the standard type which is employed by a number of light truck manufacturers. When a wide range of speed step-changes are desired a transmission having a "compound" gear reduction may be used. However, for handling the usual jobs around a construction project a transmission of the standard type should prove satisfactory.

Engineering and Oil Production

(Continued from page 69)

The engineer may also conduct or aid vocational training and supervisory training courses.

The duties of a district engineer must take into consideration the fact that there are different sizes and types of districts with differing engineering requirements. The size may vary from a small isolated district with only one engineer to a large district having the services of engineering, land, geological, purchasing, and material departments, as well as two or three engineers who specialize in certain types of work, an oil treater, field tester, and maintenance foreman. The large district will permit specialization to a certain degree whereas in a small district the duties of the lone engineer may cover all types of engineering. Thus the engineer in the smaller district may, at times, need to call upon the division engineer or specialists within the organization to lend consultation or guidance on important problems.

There are a number of tools that contribute to the petroleum production engineer's work. Some of these are: engineering texts and handbooks, complete equipment and operating records, trial equipment files, well tests, equipment tests, permanent field office engineering data and report files, engineering memorandum indexes and files, equipment catalog files, and departmental engineering highlights.

Manufacturers' service engineers or specialists within the integrated company's organization are usually available for consultation with the production engineer.

Conclusion

An engineer can become an expert or specialist in one particular field of engineering endeavor or he can become reasonably conversant with all of the various phases of petroleum production engineering. The route to follow may be determined by the particular job requirements and the ability and characteristics of the individual. Either course will require continued observation and study.

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3. John Mills, "The Engineer in Society," D. Van Nostrom Co., Inc., 1946.

4. Chaplin Tyler, Development Dept., E. I. du Pont de Nemours & Co., "Some Personal Aspects of Professional Development," Chemical & Engineering News, June 25, 1945.

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QUESTIONS on TECHNOLOGY

by W. L. Nelson
Consultng Engineer

Stratification in Storage

We encounter layers of different material in our crude-oil tanks and it upsets our refinery operations. What can we do to obtain a uniform feedstock?—S. S. H.

In direct answer to the question, all that can be recommended is that (1) suction be taken from several tanks at the same time, (2) the tanks be turned over or circulated by means of a pump, or (3) possibly the incoming crude oil can be distributed to several tanks.

Technical men agree that stratification of totally liquid materials does not occur upon standing. Thus, the only way that stratification can exist in tanks which contain nothing but liquid oil mixtures is by the pumping of one layer of material on top of another. Even such a stratification tends to mix itself over long services.

Obviously, if a solid, such as wax, is present or is produced by cooling, it can, to some extent, settle to the bottom or can be wafted about by convection currents. The waxy tank bottoms employed by some manufacturers of microcrystalline waxes are the result of several months or years of settling. Apparently the continual rise and fall in temperature of the tank results in fractional crystallization followed by settling of the wax particles to the bottom of tank where they are somewhat removed from resolution in the main bulk of the oil.

Results, however, are quite erratic. Table 1 indicates the results of sampling and testing 10 crude-oil storage tanks at different levels. The tanks were sampled at the top, one-fourth level, half level, three-fourths level, and bottom, and these designations are used in Table 1. The points where no data are given indicate a confused situation, in which the property wanders up and down in no significant way. Such a situation is indicated in Fig. 1 (Tank No. 4 of Table 1) which indicates no very definite stratification except perhaps with respect to the amount of wax. The several properties (i.e., wax content, melting point of wax, viscosity, and pour point) are generally directly proportional to one another. In other words, when one of those properties increase, the others increase, and vice versa. This behavior was evident in 26 out of 30 comparisons, although 16 were not definite because in part they were directly proportional whereas at other levels they were inversely proportional.

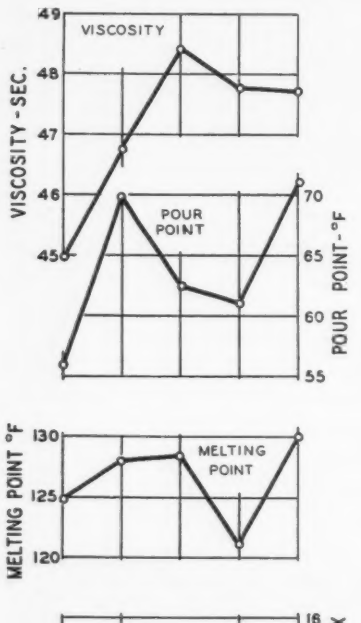


Fig. 1—Properties at different levels in crude-oil tank No. 4

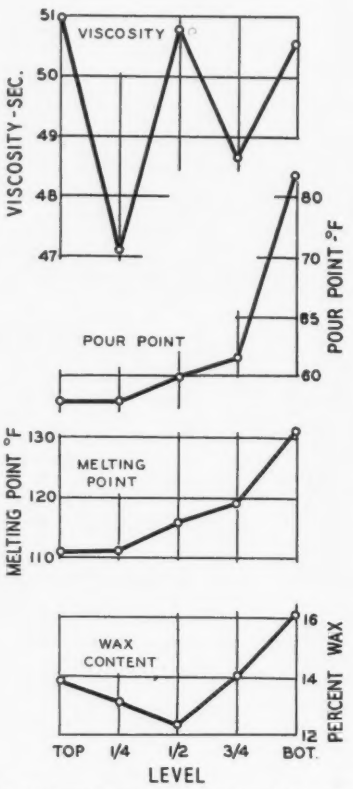


Fig. 2—Properties at different levels in crude-oil tank No. 10

Fig. 2 (Tank No. 10 of Table 2) except with respect to viscosity, shows definitely that settling has occurred. It also shows an inverse rather than a direct proportionality between viscosity and the other properties throughout most of the tank.

No very definite conclusions can be had from these tests except to emphasize again that settling in uncontrolled storage vessels is erratic.

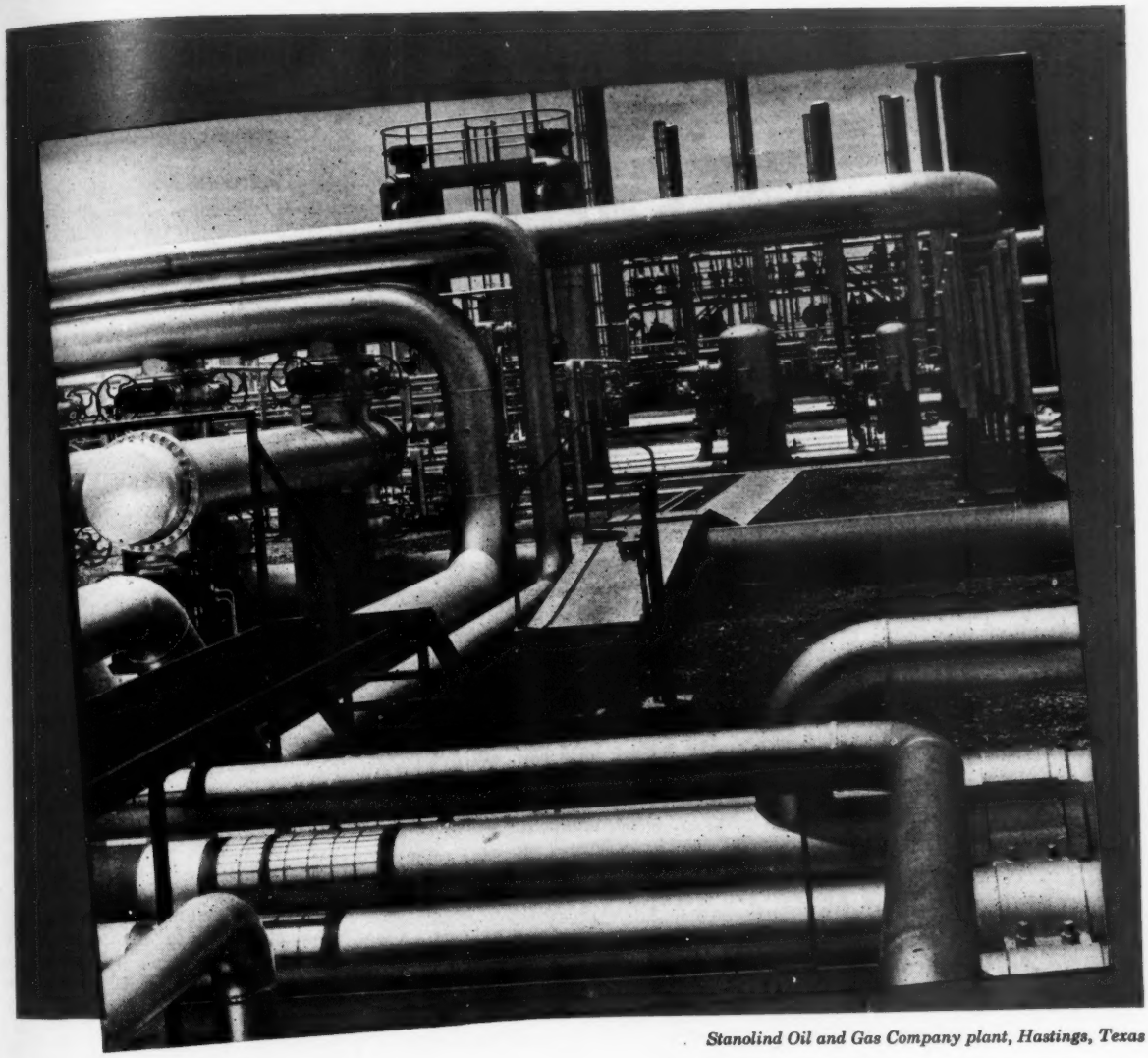
Nonmetallic Well Casing

Steel is so hard to get that we thought that some other materials might be used for shallow wells. Can you refer us to anything on this subject?—R. C. M.

Only one reference comes to mind, i.e. Frederick Squires, "Experiments in Substituting Nonmetallic Pipe for Steel Well Casing,' *The Oil and Gas Journal, February 18, 1943, page 39.* This is an abstract of a paper presented before the annual A.I.M.E. meeting. Two kinds of materials appear to be promising (1) "Fiber Conduit" composed of coal-tar pitch with a binder of wood fiber, and (2) "Transite" which is composed of cement with a binder of asbestos fiber. Short sections of each were subjected to bursting and collapse tests, and the joints were tested in tension and for leakage.

TABLE 1—CRUDE-OIL PROPERTIES AT VARIOUS LEVELS IN STORAGE TANKS

Tank No.	Time in storage, years	Date of sampling	Level at which maximum occurred: Amount of wax	Melting point of wax	Pour point	Viscosity	Did definite settling occur
1	3	fall	bottom	bottom	bottom	¾	yes
2	3	fall	.....	bottom	.....	top	no
3	3	fall	top	.....	.....	top	no
4	1	fall	bottom	.....	.....	.....	yes
5	nil	fall	.....	bottom	bottom	top and bottom	yes
6	nil	fall	.....	bottom	¾	¾	....
7	3	spring	¼	.....	.....	¾	....
8	3	spring	½	.....	.....	top	no
9	2	spring	.....	bottom	.....	top	no
10	2	spring	bottom	bottom	bottom	.....	yes



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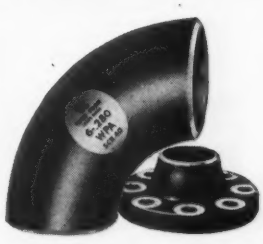

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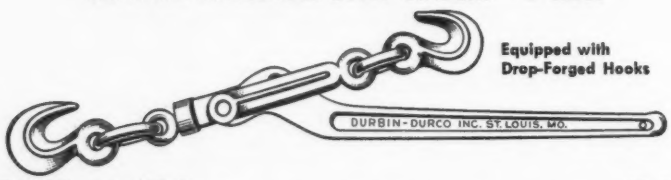

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Automatic Lease Operation

(Continued from page 77)

psi. cold working pressure units were installed. They are single-seated, normally closed valves with stainless-steel seats. On initial operation it was found that the metal seats did not in all cases provide a positive shut-off, so all units are being replaced with similar, lower-pressure valves equipped with soft seats.

When energized by the time switch, an explosionproof operating motor in each well line valve directly drives an oil-sealed hydraulic pump. The gradual buildup of hydraulic pressure raises the valve stem against a spring to full open position in 120 seconds. The motor is then cut off by an integral valve switch, but the valve is held in open position as long as the operator is energized. When the circuit is opened by the time switch, hydraulic pressure against the valve is relieved, and the valve closes by spring action in 20 seconds.

Automatic Tank Switching

The five low-pressure, 3-in., soft-seated valves installed on risers to the lease tanks are similar to the well line valves. (Fig. 3). They are energized by a tank switching system which includes tank float switches and a sequence-selecting control device. Float controls, installed in the roof of each tank, comprise a mercury switch with two sets of contacts. The switch is tilted magnetically from normal position when the float in the tank is lifted by a high oil level, opening one circuit and closing another. When a tank on the line is filled to the 15-ft. level, the float switch energizes the motor-driven sequence-selecting device mounted on the central control panel. A cam timer with five sets of contacts rotates to the contact corresponding to the next tank in the sequence. If that tank is not full, the float is in normal position, and energy is applied through the switch to the tank valve motor. If the tank is full, or if the motor valve is manually turned off, the cam timer continues its rotation until the tank-valve motor on the next available tank is energized. An auxiliary relay, energized in parallel with the motor timer, breaks the circuit to the tank-valve motor on the tank which was being filled.

Safety Precautions

A controlling circuit is provided in an under-voltage relay which drops out, shutting down all lease operation under certain conditions. Circuit diagrams showing this control in well line and tank battery systems are shown in Figs. 4 and 5.

The undervoltage relay is energized

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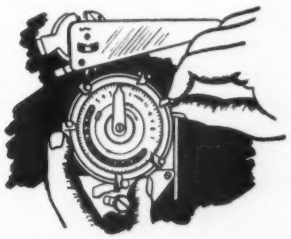

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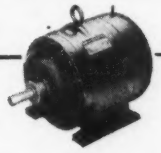

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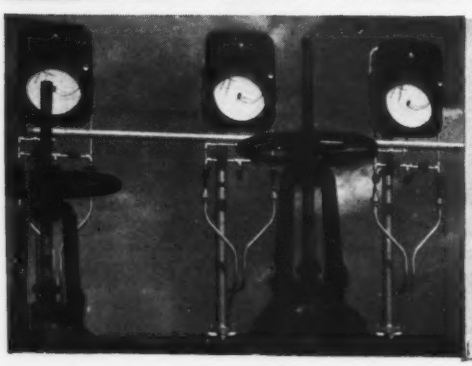
GENERAL ELECTRIC

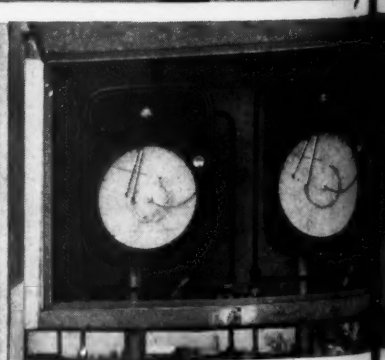
Hastings Natural Gasoline Plant of the



TOP: Dry gas overhead from absorbers

LEFT: Ahead of Compression. Three field mains equipped with Metric Orifice Meters deliver into a header

RIGHT: Twin Metric Orifice Meters on a Hastings lease. One for measuring wet gas from field gathering system, the other for dry gas used in field operations



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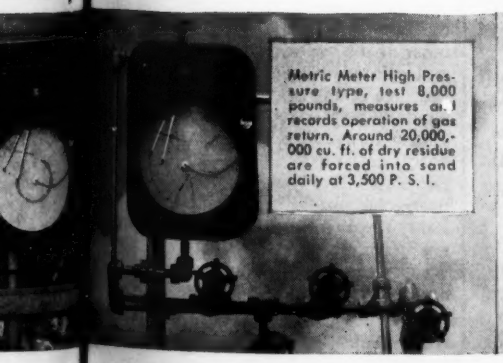
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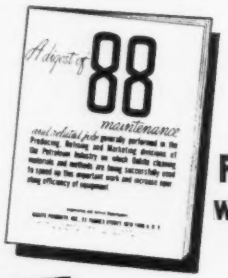

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through the master switch in series with the paralleled normally closed contacts of the five tank float switches. This relay must be energized through at least one float switch in normal position before any tank-valve motor can operate. If all tanks are either full, on pipe line or turned off for any other reason, the under-voltage relay shuts in the lease.

Safety Measure

A sixth float switch is installed near the top of the oil and gas separator. With its normally closed contacts wired in series in the under-voltage relay, it interrupts all lease operation if oil in the separator reaches an abnormal level. The relay also de-energizes the lease in case of low voltage to the tank-switching circuit.

When the lease is shut down, in the above cases, all circuits are opened except those energizing the electric time switches. This obviates resetting time clocks each time the lease is shut down. Since all valves must be energized to open, any power interruption to the lease leaves it closed down.

Each tank on the lease is equipped with a mechanical float-and-tape gaging device which allows ground-level gaging within a tolerance of ⅛ in. Remote-reading elements could be installed if desired, to allow all gaging to be done from the central control house.

Installation Delayed

Plans for the automatic tank battery date back several years, but its final installation was delayed by lack of necessary equipment. Full automatic operation began April 7, 1948. During the initial period certain adjustments and checks were necessary before trouble-free operation resulted. A constant check on well flow was afforded during this period, by a recording pressure gage mounted on the production header. Since each well flows singly at a specified time of day, this 24-hour record showed any failure of well valves to operate promptly on schedule.

Two gagers continue to operate the lease as heretofore, and each works an 8-hour shift which leaves the lease to produce unattended during two 4-hour periods each day. The automatic equipment has eliminated most of the walking to and from wells and allows the gager to devote more time to other normal duties. Total electric power consumption is estimated to average less than 10 kw.-hr. daily, costing less than $0.10 at present rates. The automatic lease has been the object of much interest in East Texas and further installations are planned in that field and elsewhere. Cost of the automatic equipment at the Coolidge lease property of Humble in the East Texas field was approximately $18,000.

Mission San Jose de Aguayo, San Antonio. Begun in 1720 and completed in 1731. From an original painting by Girard Goodenow.

Historic Missions of the Old Southwest

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Mission Manufacturing Company, Houston, Texas, hopes that you are finding in this historic series interest, pleasure and stimulation. For the story of Mission products, please turn to the next page.

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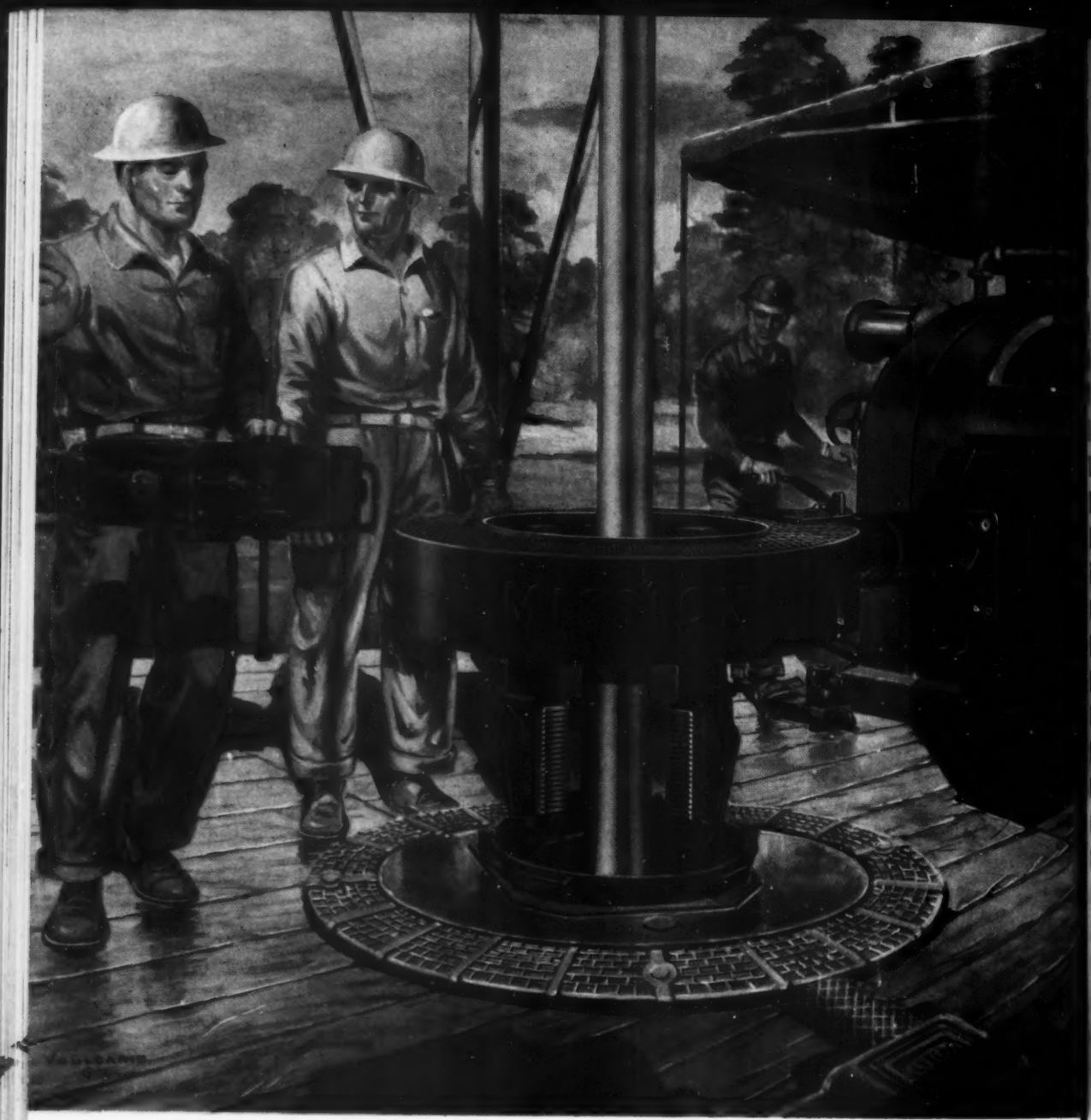

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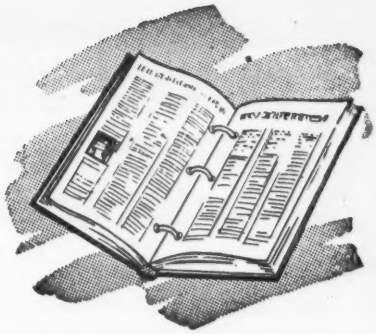
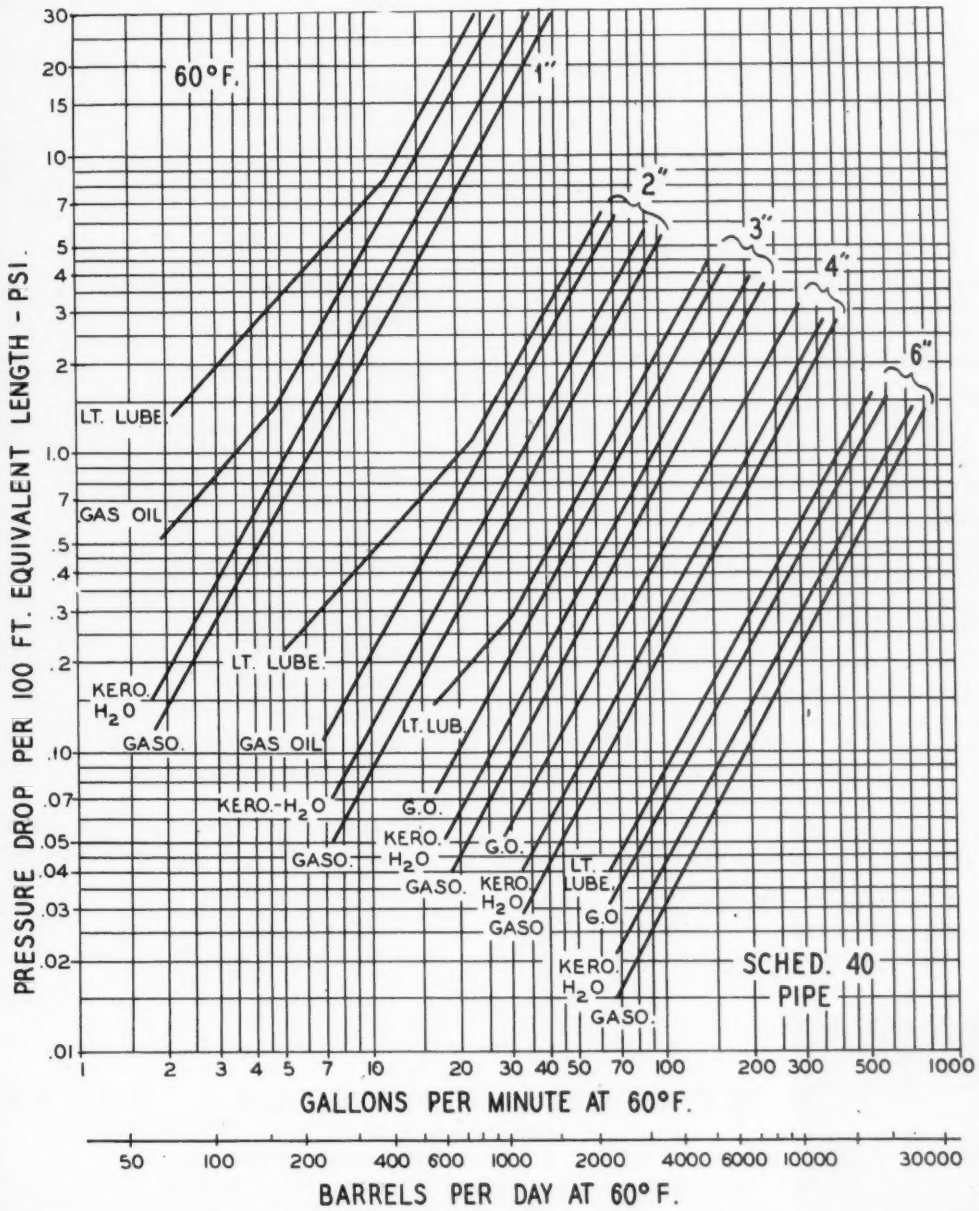


Pressure Drops—60° F.

Note.—See Notebook No. 207 for the physical properties of the gasoline, kerosine, gas oil, and lube oils. Multiplier factors for the condition of the pipe surface and for the effect of the weight of the pipe are also shown.



No. 208 in a series by W. L. Nelson, professor of petroleum refinery engineering, University of Tulsa

CHEMICAL USERS' GUIDE

to General Chemical Products for the Petroleum Industry

ALKYLATION

ANHYDROUS HYDROFLUORIC ACID
Grades or Strengths: 99.0% HF min. (one grade only)
Packing: Steel Cylinders, Tank Cars

SULFURIC ACID
Grades or Strengths: Standard
66° Baume—93.19% H_2SO_4
99% H_2SO_4
Diamond—66° Baume
Sulfuric Acid, Crystal—66° Baume
Packing: Tank Barges, Steel Tank Cars, Steel Tank Trucks, Steel Drums, also Carboys

OLEUM
Grades or Strengths: 15% free SO_3 (103.38% H_2SO_4)
20% free SO_3 (104.5% H_2SO_4)
65% free SO_3 (114.38% H_2SO_4)
Packing: Steel Drums, Tank Cars, Tank Barges

POLYMERIZATION or ALKYLATION

FLUOSULFONIC ACID—$HO:SO_2F$ (HSO_3F)
Grades or Strengths: Min. Content 98% Fluosulfonic Acid
Packing: Steel Tank Cars, Steel Drums

BORON TRIFLUORIDE, Ether Complex
Grades or Strengths: 47.88% min. BF_3
Packing: 5, 20 and 55 Gal. Drums; for Bulk Quantities write Baker & Adamson Products, General Chemical Division, Allied Chemical & Dye Corporation, 40 Rector St., N. Y. 6, N. Y.

SULFONATION

SULFURIC ACID

OLEUM

SODIUM SULFATE, Anhydrous
Grades or Strengths: Standard, approximately 99.5% Na_2SO_4
Packing: Multiwall Paper Bags

ISOMERIZATION

MURIATIC ACID (Hydrochloric)
Grades or Strengths: Standard—18°, 20°, and 22° Baume
Packing: Rubber-lined Tank Cars, Rubber-lined Tank Trucks, also Carboys

DETERGENTS

SODIUM METASILICATE
Grades or Strengths: Granular, thru 10 mesh; Powdered, 90% thru 40 mesh
Packing: Multiwall Paper Bags, Fibre Drums

DISODIUM PHOSPHATE
Grades or Strengths: Anhydrous
Packing: Multiwall Paper Bags, Fibre Drums

TRISODIUM PHOSPHATE
Grades or Strengths: Coarse, thru 10 on 20 mesh; Medium, thru 20 mesh on 100 mesh; Standard, thru 20 mesh, 15-25% thru 100 mesh; Fines, thru 40 mesh, 50% thru 100 mesh
Packing: Multiwall Paper Bags, Fibre Drums

TETRASODIUM PYROPHOSPHATE
Grades or Strengths: Anhydrous, Powdered, 100% thru 20 mesh, 90% min. thru 100 mesh
Packing: Multiwall Paper Bags, Fibre Drums

TREATING AGENTS

ALUMINUM SULFATE
Grades or Strengths: Standard-Lump, ¾"-2½" approx.; Ground, thru 8 mesh, 95% thru 10 mesh; Powdered, 97% thru 100 mesh; also Iron-Free Grade
Packing: Multiwall Paper Bags, Carloads in Bulk.

SODIUM SULFATE, Anhydrous

ACIDIZING

MURIATIC ACID (Hydrochloric)

MUD CONDITIONING

SODIUM SILICATE
Grades or Strengths: Clear and Opalescent Grades in a wide range of viscosities ranging from 38° to 60° Baume
Packing: Steel Drums, Tank Cars, Tank Trucks

DISODIUM PHOSPHATE

TRISODIUM PHOSPHATE

TETRASODIUM PYROPHOSPHATE

OTHER CHEMICALS

AQUA AMMONIA

SODIUM FLUORIDE

NITRIC ACID

HYDROFLUORIC ACID, 60%

OTHER HEAVY CHEMICALS

CATALYSTS and SPECIAL CHEMICALS

Companies requiring catalysts, addition agents, inhibitors, or other special chemicals "tailor-made" for their individual processes are invited to consult with General Chemical on their requirements. The same progressive research, technological "know how," and practical experience that has found the answer to so many petroleum chemical problems during General's long service to the Industry may provide the solution to yours, too.

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ENGINEERING *fundamentals*

Average Gas-Oil Ratios

FOR material-balance and other calculations, it is necessary to know amounts of gas produced. In the material-balance equation, the produced gas shows up as a cumulative gas-oil ratio rather than as a gas volume. The expression of gas production by gas-oil ratios is more common than by gas cumulative figures. Very often current producing gas-oil ratios are available and it is desirable to convert them to a cumulative gas-oil-ratio basis. The present discussion is concerned with the handling of such gas-measurement quantities.

Producing, or instantaneous, gas-oil ratio signifies a current rate. It is by definition the current rate of gas production divided by the current rate of oil production. It is expressed usually as standard cubic feet of gas per barrel of stock-tank oil. Such ratios are given as a result of a few hours' testing or as a result of several days of testing. The symbol R will be used to designate current producing gas-oil ratio over whatever testing period may be applicable.

Method of Computing

To obtain an average producing gas-oil ratio for several wells or for all wells in a field, one cannot take an arithmetic average value of the ratios. For example, two wells with gas-oil ratios of 2,000 and 8,000 would not necessarily have an average ratio of 5,000. They would only if both wells were producing the same amounts of oil. An average producing gas-oil ratio must be obtained by dividing total current gas production from all wells involved by total current oil production from all wells involved. Thus, if the 2,000-ratio well produced at the rate of 100 bbl. per day and the 8,000 ratio well at the rate of 50 bbl. per day, the average value of R for the two wells would be:

$$R = \frac{2{,}000 \times 100 + 8{,}000 \times 50}{150}$$

$$= 4{,}000 \text{ cu. ft. per bbl.}$$

For a large number of wells the average ratio is figured as:

$$R_{ave} = \frac{\Sigma R_i \times Q_{oi}}{\Sigma Q_{oi}} \quad (1)$$

where R_i and Q_{oi} signify the individual ratios and stock-tank oil production rates and the sign Σ means the addition of such quantities for all the wells in question.

The total gas produced in an interval of time is equal to the producing gas-oil ratio during that period of time multiplied by the oil-production rate during the interval. To find the cumulative gas produced up to a certain time on a reservoir, therefore, one needs the current ratio at various periods and the amount of production during each period.

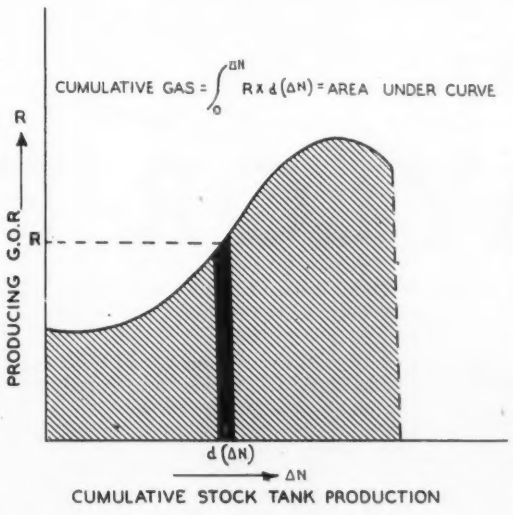


Fig. 1

If ΔN represents cumulative stock-tank production, then the production over a short interval of time is its derivative, or $d(\Delta N)$. The product of the gas-oil ratio at this interval and the production is equal to the gas produced in the interval, or:

$$\text{Gas produced in interval} = R \times d(\Delta N) \quad (2)$$

The cumulative gas produced from zero time up to a certain time t is the integral of Equation 2 or:

$$\text{Cumulative gas} = \int_0^t R \times d(\Delta N) \quad (3)$$

Expressed another way, this is the area under the curve of R plotted against the cumulative production ΔN. This is shown in Fig. 1.

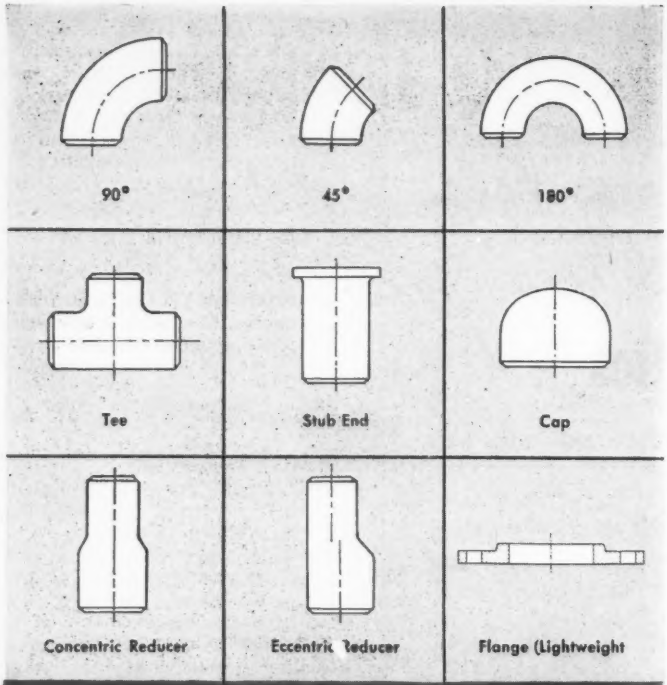
The cumulative gas-oil ratio, expressed by the symbol R_c, is defined as all the gas produced and kept from the reservoir up to a certain time divided by the cumulative oil produced at that same time. Therefore:

$$R_c = \frac{\int_0^t R \times d(\Delta N) - \text{gas reinjected}}{\Delta N} \quad (4)$$

In the case where no gas is reinjected, the cumulative gas-oil ratio is simply the area shown in Fig. 1 divided by ΔN.

In averaging individual gas-oil ratios, therefore, at a specific time, the important thing to remember is that they must be weighted according to the production which they represent. In averaging current producing gas-oil ratios at successive times to get a cumulative ratio, the important thing to remember is that the current ratios cannot be weighted on the basis of the time they represent but on the basis of the cumulative production they represent. In other words a graph of the gas-oil ratio, R, versus time does not give average or cumulative gas-oil ratio. A knowledge of R versus cumulative production is necessary as indicated by Equation 4.

Series by Dr. John C. Calhoun, Jr., Chairman, Petroleum Engineering School, University of Oklahoma



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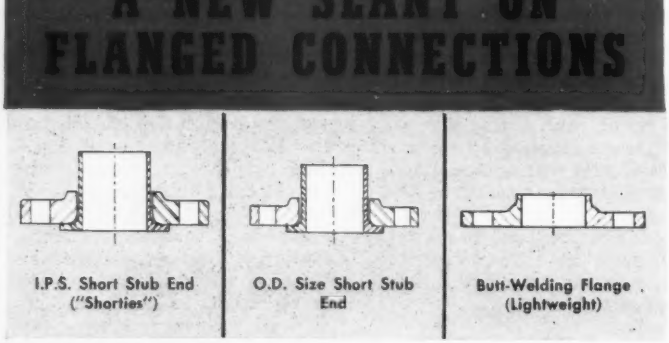
A NEW SLANT ON FLANGED CONNECTIONS



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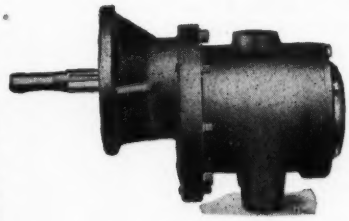
OIL AND GAS EQUIPMENT Digest

IT'S NEW CHECK IT

by John M. Spears



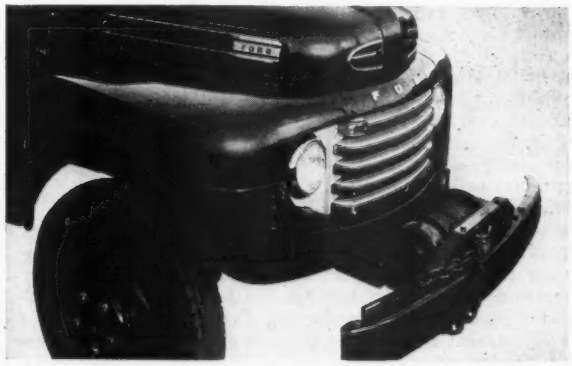
(1) NEW AIR STARTERS of two sizes are for internal-combustion engines. The air motor is keyed or splined to the Bendix or starting mechanism and the engine is cranked in the same manner as an automobile is turned over when using the electric starter. Starting motors are known as the Size 9BM and Size 20BM; the former having 9 hp. and the latter 20 hp. at 90 psi. air pressure. They are small and compact having an over-all length of only 13⅞ and 14½ in. The air motor is of the multivane type and the throttle valve is of the quick-opening type to give peak horsepower almost immediately. A single-step spur gearing is used to obtain suitable speeds. *Ingersoll-Rand Co.*

IT'S NEW CHECK IT

(2) NEW 75-TON CONNECTOR is only 22½ in. from shank pin to link seat. Designed for operators who need maximum clearance in portable and mast-type drilling, this connector has as optional equipment (1) a bail or (2) suitable adaptors for direct connection to popular makes of blocks. A clevis, for side-hook attachment, is extra equipment for use with single-bail casing tools. Advantages of the short connector are achieved by inverting the shank design of the Super Triplex line of hooks. New housing design, with sturdy link supporting ears, fully encloses the working parts. Shank is made from a forged and heat-treated piece of alloy steel and has no load-carrying threads. While the subshank and subshank nut are threaded they are subjected only to the down thrust of the low-stress relief springs. The two springs give 6 in. of soft spring travel . . . floating action that eliminates exact spotting of the traveling block. *Oil Tool Division, Byron Jackson Co.*

IT'S NEW CHECK IT

(3) NEW FRONT-END TRUCK WINCH for pulling vehicles over impassable terrain when traction fails, as well as loading, hoisting, etc., is especially designed for front-end mounting on 1½ to 3-ton trucks. Although the weight of the winch without frame is only 105 lb., the safe working capacity is 12,000 lb., and the approximate breaking point is 36,000 lb. Special worm and gear makes



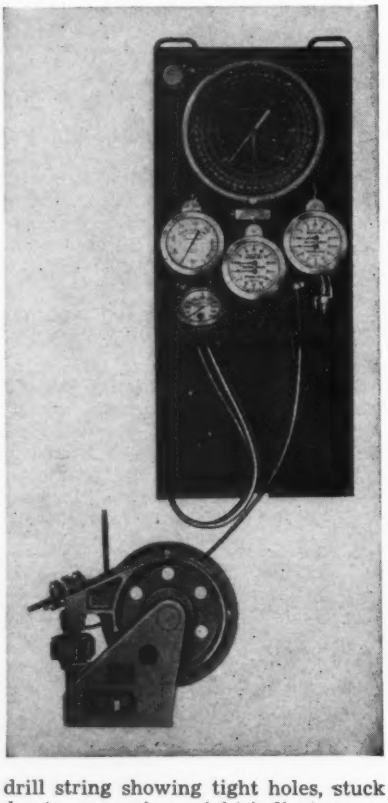
possible the great pulling capacity for a winch of this size and weight. Design of cable drum and gear case enables winch to be mounted close to the front of the truck. Complete winch kits are available for most Ford, Chevrolet, Dodge, and International trucks. Anyone capable of installing a power takeoff on the transmission can easily install winch. *Ramsey Winch Manufacturing Co.*

IT'S NEW CHECK IT

The Oil and Gas Equipment Digest presents a review of what is new in equipment and trade literature . . . makes it possible for readers to obtain full information on every subject by use of convenient "Check It—Mail It" service card. This periodic feature of The Oil and Gas Journal will include all that is new in equipment . . . at a time when new products are being introduced, and existing products improved.

Keep Informed. Save Time. Tear Out Card. Check It. Mail It.

(4) NEW WEIGHT-MEASURING METHOD. A dead-end wire-line anchor is used to actuate a hydraulic pressure transformer, which in turn transmits pressure to operate the weight indicator. Ideal Type D wire-line anchor and Martin-Decker Type D weight indicator combine the elements of (1) wheel (for anchoring the wire line) and (2) lever for measuring the load on the wire line. A gage at the driller's position registers the force on the lever which is transmitted to the gage through the hydraulic pressure unit. The load on the hook is shown directly in pounds by the gage which gives the driller a net-weight-on-bit indicator reading in thousands of pounds; a conventional weight indicator for total weight on the drill string showing tight holes, stuck pipe, load on derrick, etc.; a vernier weight indicator providing the engineer a permanent record of each 24-hour operation. Dead-line whip can neither affect weight indicator reading nor damage the instrument. It requires no adjustment for number of lines strung or cable diameter. Design of wire-line anchor permits the line to be moved around the drum, eliminating sharp bends and the use of numerous small rope clamps. Three turns around the anchor drum provide a coil-brake effect with the result that only a small fraction of the full line pull is transmitted to the clamp. *Martin-Decker Corp. and National Supply Co.*



IT'S NEW CHECK IT

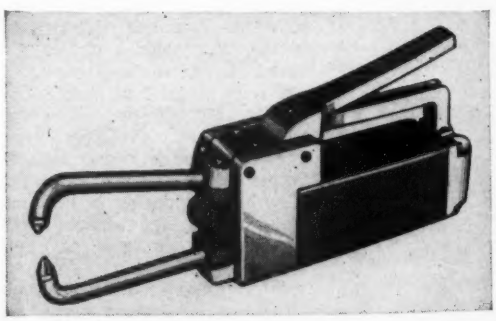
(5) FULL-FLOW VALVE is a cam-actuated piston-type valve for handling petroleum products, chemicals, and other liquids. It is especially designed for application where a positive shutoff valve is required without the quick coupling or tripproof features. Valve accommodates a 2½-in. line and weighs only 13 lb. in bronze. It is designed for a flow of 200 g.p.m. at 25 psi. The area of the valve is 20 per cent greater than the line area, thus affording no restrictions to flow. Cam is designed to allow full control of flow for loading purposes. Valve may easily be closed without hammer. Valve closing is effected by spring action, providing a seal at static pressures. End connections are sealed with vellumoid gaskets. The main-line seal may be replaced without disassembly by merely removing the retainer screw. *Roylyn, Inc.*

IT'S NEW CHECK IT

(6) NEW SIDE-WALL CORING TOOL makes multiple side-wall coring possible. Tool can take up to 30 side-wall cores at one time, with good recovery. Core barrels are imbedded in the gun section, with six barrels per section. Five of these may be run in tandem, making the 30 cores per trip possible. Here Wilfred Tapper, head of the electrical well services department of Halliburton, points to the self-potential well-logging ring incorporated in the tool. *Halliburton Oil Well Cementing Co.*

IT'S NEW CHECK IT

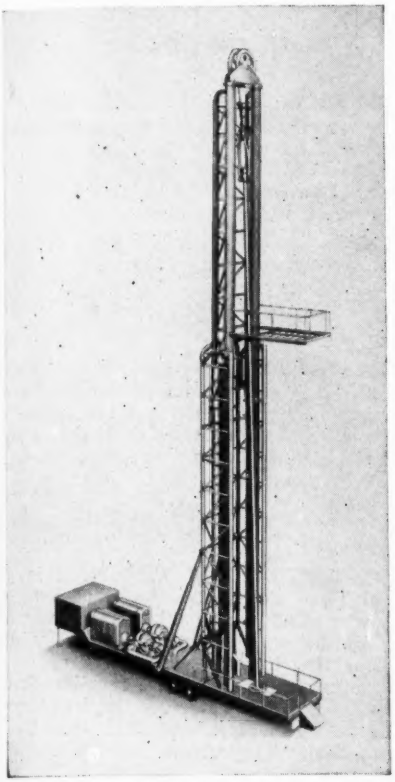
(7) PORTABLE SPOT WELDER, compact and light in weight (23 lb.), will weld up to ⅛-in. metal, combined thickness. Replaceable tips and tongs, available in stock

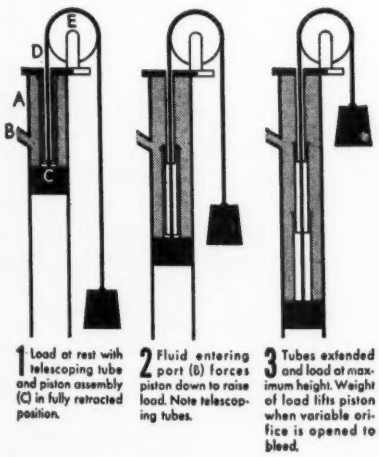


in 6, 12, and 18-in. lengths, enable the welder to reach the hard-to-get-at corners. Special tongs with offset tips are also available. Welder is capable of spot welding 150 spots in 5 minutes. There are six models for use on 110-volt or 220-volt a.c. current—the unit can be operated on 220-volt service with a 15-amp. fuse and on 110-volt service with a 30-amp. fuse. *Metal Goods Corp.*

IT'S NEW CHECK IT

(8) HYDRA-LINE RIG combines hydraulics with wire line for hoisting operations in drilling rigs, pulling rigs, and pumping units. Unit completely eliminates draw works and traveling-block assemblies. Raising and lowering are accomplished by simple manipulation of a single microsensitive control. New principle provides unlimited number of hoisting speeds, greater "hook" horsepower per input horsepower, virtually unlimited

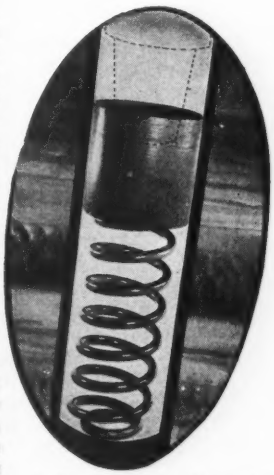



E
D
A
B
C
1 Load at rest with telescoping tube and piston assembly (C) in fully retracted position.
2 Fluid entering port (B) forces piston down to raise load. Note telescoping tubes.
3 Tubes extended and load at maximum height. Weight of load lifts piston when variable orifice is opened to bleed.

derrick height and drilling depth, fluid cushioning to minimize load shocks, sealed-in oil-bathed protection for all working parts, a single control for all hoisting operations, and a high rig and crew safety factor. Hydra-Line rig consists of only five principal parts: a smooth-bore steel cylinder (1); sealed top and bottom and with one common input-output port (2); piston and telescoping tubes assembly (3); a wire line (4) passing through the telescoping tubes and secured to the piston; and a large-diameter crown sheave (5), positioned to carry the wire line from the piston to load being raised or lowered. Fluid introduced in the cylinder above the piston forces the piston downward to lift load suspended from wire line—fluid bled from the cylinder plus air pressure compressed during piston down travel, forces the piston upward to lower the load. *Hydra-Line Division, Johnston Enterprises.*

IT'S NEW — CHECK IT

(9) MOUSE-HOLE CONNECTION AID assures perfect alignment of kelly and "single" on the first stab and eliminates galled threads. It consists of a steel bowl attached to a strong coil spring. Center of bowl revolves on heavy ball bearings. It is provided with washout ports whereby mud and sand may be flushed out. When the joint aid is lowered in the mouse-hole, the weight of single is carried on the spring. Thus, when the kelly is set on the single, both "float" on the spring. With the weight absorbed by the spring, the kelly stays in perfect alignment with the pipe, thereby eliminating the misalignment usual when the kelly swings off center because too much weight is placed on it and the single rests on solid bottom of the mouse hole. *Owen Tool Co.*



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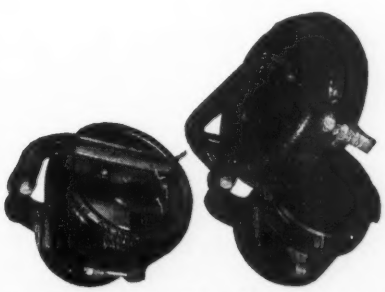

(10) PIPE-LINE SCRAPER TRAP is of hinged design which permits the operator to swing the scraper trap closure open or shut. The closure, or blanking plug, is so perfectly balanced on its hinge that it requires little effort for opening and closing. Trap employs the Unibolt design of tapered interlocking shelves between the nut member and the lug hub or blanking plug which are drawn together by simply tightening a single bolt. A resilient and replaceable gasket effects a leakproof seal when the bolts are tightened. *Thornhill-Craver Co.*

IT'S NEW — CHECK IT

TRADE LITERATURE

(11) TRUCK AND TANK-CAR LOADING ASSEMBLIES. New 32-page catalog describes flexible dome-type loading assemblies. Nine types of loading assemblies are illustrated. Swing joints, ball joints, and other accessories also are shown. *Oil Equipment Manufacturing Co.*

IT'S NEW ✓ CHECK IT

(12) REMOVABLE SIDE-DOOR CHOKES. New 16-page booklet, printed in 4 colors, contains 29 illustrations covering all standard applications of removable side-door chokes and supplementary equipment in the completion and production of single and two-zone wells. *Otis Pressure Control, Inc.*

IT'S NEW ✓ CHECK IT

(13) SINGLE-STAGE CENTRIFUGAL PUMPS. Comprehensive catalog presents features of single-stage pump design and construction, listing pump ratings and incorporating essential dimensions. Engineers can select the required pump, estimate motor size and plan approximate installation dimensions. *De Laval Steam Turbine Co.*

IT'S NEW ✓ CHECK IT

(14) DIESEL-ENGINE TEXTBOOK. General information on high-speed, heavy-duty diesel engines is given in 28-page, 2-color book. Discussed in detail are: the fundamentals of diesel power and its advantages; engine construction with sectional illustrations; a treatise on patented combustion chamber and a detailed description of how it functions; operation of the four-cycle engine with functional charts and diagrams; and a discussion of fuel-injection equipment and governors. *Hercules Motor Corp.*

IT'S NEW ✓ CHECK IT

(15) FLUID-METER DATA. A 40-page booklet is divided into 10 different sections describing flow mechanisms, primary elements, integrators, auxiliary recorders, accessories, and installation features. Each section is well illustrated by photographs and drawings of equipment. *Bailey Meter Co.*

IT'S NEW ✓ CHECK IT

(16) FRICTION-CLUTCH-TYPE CATHEAD. New bulletin describes new cathead which can be supplied with mechanical or fluid-pressure control. Cathead provides safety, simplicity, and economy for both joint breaking and spinning. *J. H. Schreiber Co.*

IT'S NEW ✓ CHECK IT

(17) RETAINER PRODUCTION PACKER. New two-color folder describes production packer with the following features: completely drillable, withstands high temperature, no "set down" weight required, anchored both up and down, corrosion resistant, and tubing free from packer. *Baker Oil Tools, Inc.*

IT'S NEW ✓ CHECK IT

(18) HARD-FACING OIL-FIELD EQUIPMENT. A 28-page booklet gives simple step-by-step instructions for applying hard-facing metal to all types of wearing parts in oil-field machinery and equipment. Because of the importance of proper bit dressing, a large part of the booklet is devoted to correct methods for protecting various types of drilling and coring tools. *Haynes Stellite Co.*

IT'S NEW ✓ CHECK IT

(19) WELL-LOG FORMS. New 16-page catalog illustrates 33 different forms of blank well logs available for immediate delivery. Included are illustrations of drilling-time well logs, percentage well logs, and the conventional types of well logs. *Ross-Martin Co.*

IT'S NEW ✓ CHECK IT

(20) MECHANICAL FLOW METERS. Ring-balance mechanical flow meters are described and illustrated in detail with photographs, diagrams, and data on dimensions and capacities in new 12-page bulletin. Bulletin describes ring balance principle of operation. Other features are ease of adjustment, recalibration of deadweight method or by a water column, high accuracy and elimination of over-range-operation troubles for both low-pressure and high-pressure flow meters of this line. *Hagan Corp.*

IT'S NEW ✓ CHECK IT

(21) SPEED CONTROL FOR BOILER-DRAFT FANS. New 20-page booklet, "Precision Speed Control for Boiler Draft Fans with the Regutron Controlled Magnetic Drive," discusses principles of operation with graphs, diagrams, and installation pictures. Booklet describes how adjustable speed magnetic drive with Regutron control provides wide range, smooth, precise, rapid, and dependable speed control. *Electric Machinery Mfg. Co.*

IT'S NEW ✓ CHECK IT

(22) GENERAL PURPOSE ELECTRIC MOTORS. New "Handy Guide for Quick Selection of Electric Motors" is a 12-page bulletin providing detailed specifications covering squirrel-cage induction motors and application data, range of sizes and speed torque curves on synchronous, wound rotor, and direct current motors. *Allis-Chalmers Mfg. Co.*

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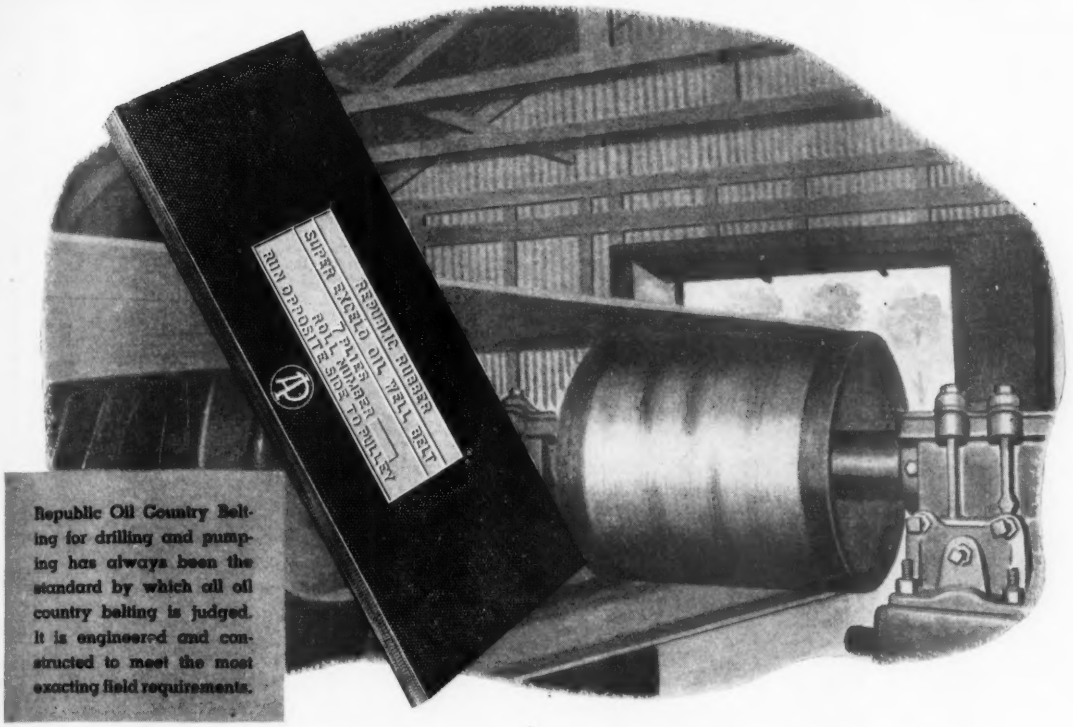

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A Few Brands known to Industry for over a QUARTER CENTURY

No "family doctor" prescribes medicine for his families more skillfully or sincerely than a distributor of industrial supplies selects materials and products for his industrial customers.

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with DU PONT DULUX Metal Protective Paints

Rusting of exposed metal is an always-present maintenance headache for oil refiners. Structures and equipment require a *rugged* finish to protect the investment against this insidious disintegration. That's why so many maintenance men use DULUX for long-term protection.

These men make their selection on *facts*. They know the DULUX Metal Protective Painting System directly controls corrosion in two important ways. First, the resulting film is highly impermeable to moisture. Thus, an effective barrier is provided. Secondly, the DULUX Primers discourage rusting *chemically*. This two-way approach to the problem is their assurance of long-term protection.

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For technical advice on your maintenance painting problem, write to E. I. du Pont de Nemours & Co. (Inc.), Finishes Division, Wilmington 98, Delaware.

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PAINTS

NATURAL GAS

Mississippi River's Rate Schedules Are Approved

Supplementary rate schedules filed by Mississippi River Fuel Corp. for sales of natural gas to six customer companies in Missouri, Illinois, and Arkansas have been approved by the Federal Power Commission to become effective January 20, 1946 and October and November 1947.

For all bills based on meter readings made after January 20, 1946 through September 1947 the net monthly firm gas rates will be composed of a demand charge of $1 per thousand cubic feet of maximum demand and a commodity charge of 13 cents per thousand for all deliveries. The net monthly rate for interruptible gas is 14 cents per thousand for all deliveries.

For all bills beginning October 1, 1947, a net monthly rate for firm gas carrying a demand charge of $1.12 per month per thousand cubic feet of maximum demand and a commodity charge of 13 cents per thousand for all deliveries. The interruptible rate continues at 14 cents.

FPC Reports on Survey of Utility Regulatory Bodies

Commissions with power to regulate one or more of the public-utility industries exist in 47 states, and in the District of Columbia, Hawaii and Puerto Rico, according to a recent report by the Federal Power Commission. The state of Delaware and the Territory of Alaska have no public service commissions.

The report, which is the result of a survey showing the extent of state commission jurisdiction and regulation of electric and gas utilities in the nation, also includes a list showing the name and address of each utility regulatory commission, the names of the commission members and the names and titles of the principal officials of each commission.

The publication, entitled "State Commission Jurisdiction and Regulation af Electric and Gas Utilities," may be obtained from FPC, Washington, for $1 per copy. Order number is FPC-S-60.

United Withdraws Rate Schedule Supplement

A supplementary rate schedule filed by United Gas Pipe Line Co. to cover sales of natural gas to Mississippi River Fuel Corp. and recently suspended by the Federal Power Commission, has been withdrawn by United. The proposed rate schedule involved an increase in rates amounting to approximately $430,000 annually.

Following a conference held last month between United Gas, Mississippi River Fuel, and the staff of the commission, United notified the commission that it was withdrawing the filing of the suspended rate schedule supplement.

FPC Gives Approval to Panhandle Rate Schedules

Supplemental rate schedules filed by Panhandle Eastern Pipe Line Co. covering sales of natural gas to Michigan Consolidated Gas Co. at Detroit and to Michigan Gas Storage Co. have been authorized by the Federal Power Commission to take effect as of July 17, 1947.

The order provides that Panhandle will apportion the approximately 195,000,000 cu. ft. of gas daily in the ratio of 52 per cent to Michigan Consolidated and 48 per cent to Michigan Gas Storage until the total amount of gas delivered to the two companies dating from May 15 has reached the ratio of 55.6 per cent to Michigan Consolidated and 44.4 per cent to Michigan Gas Storage. When this ratio has been reached deliveries will be maintained to the two companies until October 31, 1948.

The supplemental schedules also provide for the installation by Panhandle of flow controllers at its Detroit delivery point to put its deliveries of gas to Michigan Consolidated on an approximately uniform hourly basis.

Operating Revenue Up 11 Per Cent for May

Operating revenues of natural-gas companies reporting to the Federal Power Commission amounted to $63,091,033 in May 1948, an increase of 11.7 per cent over the total reported for the same month a year ago.

Gas utility operating income for May 1948 amounted to $9,605,673, up 2.5 per cent over the same period a year ago. However, net income for the month was $9,980,626 as compared to $10,486,850 reported in May 1947, or a drop of 4.8 per cent.

For the 12 months ending May 31, 1948, gas operating revenues totaled $776,324,440, an increase of 11.1 per cent over that reported for the 12 months ending May 31, 1947.

Revenues from sales to ultimate consumers increased 5.4 per cent and amounted to $33,744,054. Revenues from residential and commercial consumers were down 0.7 per cent and 1 per cent, respectively. Revenues from industrial consumers were up 14 per cent.

Pacific Coast Gas Group Program Is Outlined

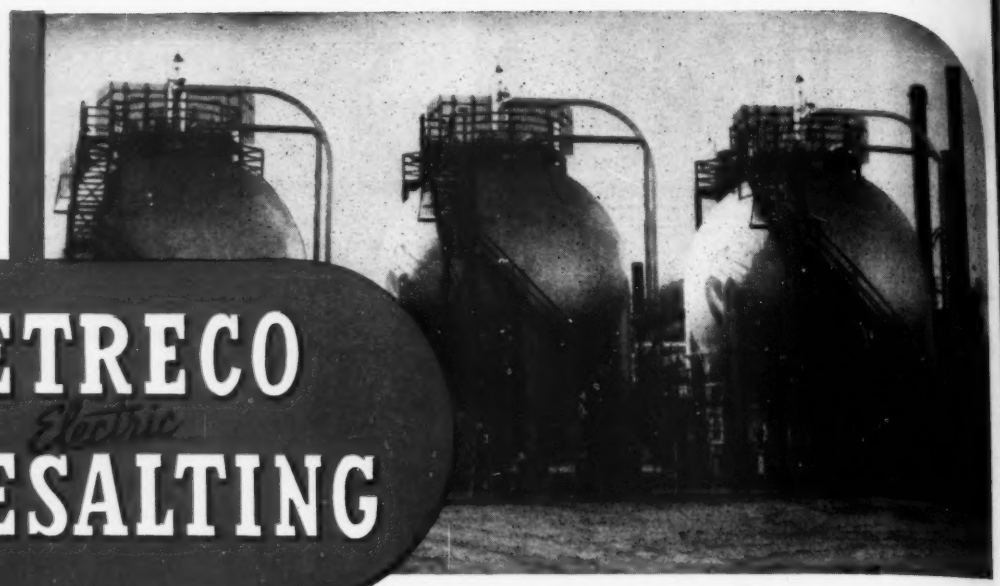
Four general sessions, which will feature reports and discussions on problems and needs as concerns the Pacific Coast gas industry, have been scheduled on the 3-day program of the Pacific Coast Gas Association, fifty-fifth annual convention, Hotel Casa del Rey, Santa Cruz, Calif., September 14-16.

Besides addresses to be delivered by leaders of the American Gas Association and Gas Appliance Manufacturers Association, which will be given at the first general session other subjects to be included on the program are: "The Peak Load Problem and Ways to Meet It," "The Pacific Coast Business Picture," "National Sales promotion and Research Effort of the Industry, Slanted to Pacific Coast Needs," "The Steel Outlook for Utilities and Manufacturers," "Long-Range Planning for Gas Utilities in the Pacific Northwest," "The Effect of Claims on Public Relations," and "The Liquefied Petroleum Gas Industry."

Movies, Reports Feature Annual I.N.G.A.A. Meet

Two moving pictures and seven reports by leading men in the various phases of the natural-gas industry will highlight the program of the annual meeting of the Independent Natural Gas Association of America to be held at the Mayo Hotel, Tulsa, October 26.

Included in the 1-day program: "President's Report," Joseph Bowes, Oklahoma Natural Gas Co.; "Natural Gas Reserves," N. C. McGowen, United Gas Pipe Line Co.; "What's New in Steel," H. Leigh Whitelaw, managing director, G.A.M.A.; "Relationship Between Distributing Company and Transporter," Guy T. Henry, Central Indiana Gas Co.; "Questions Posed by the Royalty Owners," R. C. Kay, Amarillo, Tex.; "The Unlucky Fuel of 20,000 Uses," James Pew, manager, natural-gas and natural-gasoline division of Sun Oil Co.; "The Legal Committee Reports on Current Problems," Marshall Newcomb, Lone Star Gas Co.; and the two movies—"The Arabian Pipe Line" and "The California Section of the Texas-California Line."



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REFINING

Petrochemical Plant Is Closed, Strike Continues

CORPUS CHRISTI.—Celanese Corp. of America's $25,000,000 Chemcel plant near Bishop, one of the largest petrochemical installations on the Gulf Coast, remained closed down this week as a result of a strike called July 26 by the Oil Workers International Union.

No resumption of negotiations between management and union representatives were reported. The walkout followed after 62 days of negotiations. The union demanded a 30-cent hourly wage increase; the company offered a 13-cent adjustment, and there were differences on the question of seniority, severance pay, and sick benefits.

About 700 employes, mostly members of the O.W.I.U., were taking part in the strike. Unaffected were about 100 nonunion supervisors, and about 150 clerical workers. A Texas Ranger detachment set up a station near the plant entrance along with the union pickets.

Further expansion at the plant has been in progress, and construction on four new buildings was halted by the walkout. Carpenters and steel workers refused to cross the O.W.I.U. picket lines.

New Sohio Cracking Unit Is Under Construction

Ground-breaking ceremonies early this week marked the beginning of construction of the new fluid catalytic cracking unit of Standard Oil Co. (Ohio) at its Lima refinery. It is the first unit of the company's $16,000,000 expansion and modernization program, which will double capacity at the Lima refinery, to get under way.

Besides the $11,000,000 cracking plant the program of expansion and modernization includes 20,000,000-gal. additions to the tankage facilities and the $5,000,000 oil refining unit, a combination crude-oil distillation and coking plant which will add 15,000 bbl. daily to the crude-oil processing capacity of the Lima plant.

The new unit which will charge 16,000 bbl. daily of gas oil is expected to produce 30 per cent more gasoline per barrel of crude oil than present company facilities. Completion is scheduled in 12 to 15 months. Arthur G. McKee Co., Cleveland, Ohio, has the contract for construction.

Sohio, which now employs 235 men at its Lima refinery, will increase its working force by 75 or more men when the new unit is completed.

Sinclair Develops New Rust Preventive, RD-119

Additive RD-119, a rust preventive to be used in pipe lines, large storage tanks, tank cars, automobile tanks and consumers' heating oil tanks, has been developed by the research department of Sinclair Refining Co.

"There is no predictable limit to the length of pipe line that can be rust-prevented by injection of RD-119 at the manufacturing point," according to E. W. Isom, in charge of Sinclair's research and development department.

The additive does not affect the specification tests or performance of the products to which it is added, nor will it result in any higher cost to ultimate consumers of products so treated, company officials said.

Plant in England Will Make Styrene Copolymers

Styrene Co-Polymers, Ltd., a new company recently formed by joint agreement between the Berger Group of Companies, paint manufacturers, and the Petrocarbon, Ltd., Petrochemicals, Ltd., Group of Companies, manufacturers of petroleum chemicals, has announced plans for the construction of its new factory near Partington, Cheshire, near Manchester, England, for the production of copolymers of styrene.

The new plant will make use of the Berger styrene patents and the Catarole process operated by Petrochemicals, Ltd., which will produce at low cost industrial quantities of monomeric styrene from which the copolymers are manufactured.

Frontier Chemical Plans Enlarged Texas Plant

Plans to enlarge its chemical manufacturing plant at Denver City in southwest Yoakum County, Texas, to produce approximately 2,000 tons of hydrochloric acid and some 600 tons of caustic soda monthly—about twice the present output—have been an-

A conventional Dessicant dehydrator for small capacity service is often too expensive to operate because at times the moisture present is approximately:

90% Free water
10% Dissolved water

When a dessicant dehydrator "ONLY" is used the entire load of *free* and *dissolved* water must be handled in one stage, causing frequent and expensive re-activation operations.

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With as much as 99.9% of the free water already removed, it is possible to use a comparatively small dessicant chamber that will not require re-activation. The dessicant can be thrown away much cheaper than the expense of re-activation drying equipment . . . even for years of operation.

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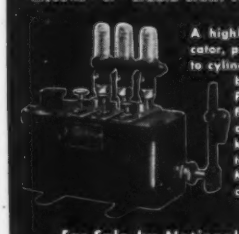
McCORD "SF" LIQUID SIGHT FEED LUBRICATORS



A highly developed lubricator, particularly adapted to cylinder and bearing lubrication. Features: Precision built, most flexible and positive oil delivery system known. Supplied in 1 to 24 feeds. Specify McCord "SF" Lubricator.

For Sale by National Supply Co.

McCORD CORPORATION
DETROIT 11, MICHIGAN
LUBRICATOR DIVISION

nounced by Frontier Chemical Co., Midland, Tex.

The new units are expected to be in operation by December 1, according to Robert L. Floyd, president.

Hydrochloric acid is used in treating oil and gas wells and caustic soda for refineries and as an ingredient in some varieties of oil drilling fluids.

Sunray Doubles Runs Of Company's Own Crude

The amount of the company's own crude oil processed at the Sunray Oil Corp. refineries in the first 6 months of 1948 as compared to the same period last year has increased 100 per cent, according to F. L. Martin, executive vice president of Sunray.

Sunray is now producing 58 per cent of its own daily production against a throughput of 29 per cent of production reported for the first 6 months of 1947.

The company's total charge to its own refineries amounted to more than 4,057,000 bbl. from January through June of this year as compared to more than 2,092,000 bbl. for the same period last year.

Sunray's refineries include its Duncan, Okla., plant of 20,000 bbl. daily crude-oil capacity; its Allen, Okla., refinery of 12,500 bbl. capacity; and the Santa Maria, Calif., plant of 7,000 bbl. capacity.

Socony-Vacuum Backs Atomic Energy Studies

Socony-Vacuum Oil Co., Inc., has granted $250,000 to the Massachusetts Institute of Technology, Cambridge, Mass., for the purpose of carrying out a research program in atomic energy and the fundamental structure of matter.

The grant will be made at a rate of $50,000 per year for 5 years, company officials said, and will be utilized at the school's discretion to provide facilities and scientists for carrying out the actual work involved in solving a number of problems in nuclear fission.

Earlier this year The Texas Co. awarded a $250,000 grant to M.I.T. for atomic research and the training of nuclear scientists.

Pure Oil, Texas Gulf Plan Sulfur Plant

Negotiations were recently completed between Pure Oil Co. and Texas Gulf Sulfur Co. for installation of a sulfur recovery plant in Worland field, Wyoming, according to Comer Plummer, Pure's vice president for production.

The plant is scheduled for completion and operation next year and will be capable of processing a minimum of 30,000,000 cu. ft. of gas daily containing more than 10,000,000 cu. ft. of hydrogen sulfide.

Texaco Renews Fellowship

NEW YORK.—Continuing its policy of promoting and supporting scientific and technological research, The Texas Co. has renewed an industrial fellowship at Purdue University, under Dr. G. Stanley Meikle, director of the Research Foundation at Purdue. This fellowship is based on the need for study of the rapidly growing importance of catalysis and catalytic processes in the chemical and petroleum industries.

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Purchase of a 5000 b/d refinery by this fast-growing, well-established company, now serving the midwest, makes it necessary to add key personnel who can step directly into positions of real responsibility.

The men we seek will have had several years of refinery experience or background in the jobs outlined here, and may or may not be seeking new employment.

Offices and refinery are at St. Elmo, Illinois, a town of 2,500, about 70 miles east of St. Louis, Missouri. Housing on jobs 1, 2, 3 and 4 will be provided by the company at moderate rental.

Although the qualifications are exacting, their purpose is to select only men whom we feel will fit in well and establish a successful career with our company. Those who qualify will have every opportunity for advancement, and will have the cooperation of our entire organization.

When writing, give complete resume in outline form of experience and training, including age, marital status, availability and salary expected. After application has been reviewed our interviewer will contact you in your city. Apply in full confidence to: Personnel Manager, Northwestern Refining Co., St. Paul Park, Minn.

In addition to high base pay, EVERY NORTHWESTERN POSITION HAS A REAL INCENTIVE PLAN.

1. SUPERINTENDENT: Take complete charge of rehabilitation and subsequent operations. Aid in selection of personnel to operate and maintain refinery and supervise minor construction. B.S. degree in engineering required. Prefer man with at least 2 years' supervisory experience and 5 to 10 years' experience in refinery operations, maintenance and construction, including topping, thermal cracking, treating, boiler operation, etc. Must have knowledge of laboratory control and refinery accounting procedures.

2. CONSTRUCTION SUPERINTENDENT: Take charge of construction and maintenance. Must be able to supervise, and purchase materials and equipment; inspect work performed under contract. Require B.S. degree in engineering and 5 years' experience in general construction work, at least half of which was spent in refinery maintenance, construction or design.

3. ENGINEER: Age 25 to 40. To work closely with superintendent in planning refinery development and maintenance. Require B.S. degree in engineering and 2 to 3 years' experience in refinery operation, construction, laboratory work, and plant process and design.

4. CHEMIST: Age 25 to 40. Take complete charge of laboratory. B.S. degree in chemistry required. Prefer man with 5 years' experience in refinery work, at least half of which was spent in refinery control and research or development work. Must know refinery processing methods, including topping, thermal cracking, treating, etc.

5. ACCOUNTANT-OFFICE MANAGER: Must have sufficient education and experience to take full responsibility for refinery accounting system and supervise office personnel and operation. Prefer man with degree in business administration and major in accounting.

6. SALES MANAGER: Need aggressive administrator with imagination and ability. Must have thorough knowledge of wholesale marketing of gasoline and fuel oils, from the view-point of the independent company. Will be responsible for market surveys, supervision of sales and coordination of sales with production. College education desirable. Let us know of your past sales records.

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PIPE LINES

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Light in weight—easy to handle and apply.
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Standard roll widths: 4", 6", 9", 12" and 18". Standard roll length 430' for pipe diameters up to 14"; 800' for pipe diameters up to 16" and above. All standard sizes available for immediate shipment from warehouse stocks.

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PIPE LINES

Sinclair Builds Products Line Into Philadelphia

Sinclair Refining Co. is laying pipe for a 28-mile, 8-in. Somastic coated products line from its Chelsea, Pa., tank farm to a terminal located on Huntington Park Avenue, Philadelphia.

The Chelsea tank farm is 4½ miles northeast of the Sinclair refinery at Marcus Hook, Pa.

This products line is being constructed across suburban estates and through a densely settled Philadelphia metropolitan area to a terminal which will serve a concentrated market for products consumption. As a result, economies will be obtained by reducing the length of truck hauls. Several months ago a Sinclair products line was built into the heart of the business district of San Antonio, Tex.

Construction of the Philadelphia project has been contracted by Austin Meehan and partners.

Survey Completed for Tierra del Fuego Line

David R. Williams, vice president, Williams Brothers Co., and William G. Heltzel, consulting engineer, have completed their survey for a crude-oil pipe line to be built for the Government of Chile from Manantiales (Spring Hill) oil field to the projected marine terminal at a location known as Caleta Clarence, 6 miles from Puerto Percy, Tierra del Fuego. In connection with the project there will be built several 80,000-bbl. tanks and a pump station at Manantiales.

Atlantic Surveys for Permian Basin Outlet

Atlantic Pipe Line Co. has completed a preliminary aerial survey of the right-of-way for a second crude trunk line from the Permian Basin to the Gulf Coast, according to reports.

The proposed line would extend from the company's present West Texas terminal in the Block 31 field, Crane County, Texas, to the Corpus Christi area. Atlantic operates a barge and tanker loading terminal there for handling southwest Texas field crude.

Total distance would be about 400 miles, and planned diameter of the line is said to be 10-in. with an average capacity of about 45,000 bbl. daily.

Pipe for the line has been on order for some time, but it is indicated that delivery will not be before the first part of 1950.

Atlantic's present 10-in. trunk line from the basin runs to Atreco, near Beaumont. It has operated at capacity load of 47,000 bbl. daily for several years. The company supplements this movement with tank-car shipments of 10,000 bbl. daily to the East Texas field. From there it is piped to Atreco.

Increase Sought for Tex.-Calif. Transmission

The Federal Power Commission will hold a consolidated hearing on application from El Paso Natural Gas Co., Southern California Gas Co. and Southern Counties Gas Co. of California to expand facilities.

El Paso Natural Gas proposes to increase the capacity of its pipe line from the Texas Panhandle to the Blythe, Calif., area by 180,000,000 cu. ft. of gas daily.

The company said the expansion will enable it to sell 100,000,000 cu. ft. of gas additional daily to the Southern California Gas Co. and Southern Counties Gas Co. of California and 80,000,000 cu. ft. additional daily to customers in Arizona, New Mexico, and Texas.

The two California companies asked, in a joint application, authority to increase the capacity of a Blythe-to-Los Angeles pipe line sufficiently to handle the additional gas from El Paso Natural.

Northern Natural Plans Looping of Kansas Line

Northern Natural Gas Co., Omaha, Neb., has been authorized by the Federal Power Commission to construct approximately 11 miles of 24-in. pipe-line looping from the Clifton, Kans., compressor station northeast to a point in Washington County, Kansas; and about 1 mile of 24-in. line beginning at the Mullinville, Kans., compressor station and extending northward to replace an existing line.

The new facilities would increase deliverability of the company's capacity north of Clifton, Kans., from 390,-

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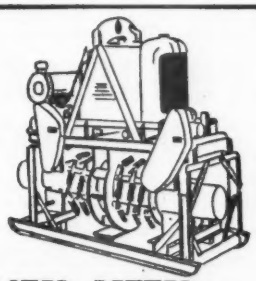

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Available in 3 Models:

Model O—2" to 12" Lightweight portable unit for small reconditioning projects.
Model M—2" to 16" pipeline machine.
Model K—16" to 30" pipeline machine.

Available on rental or outright sale basis

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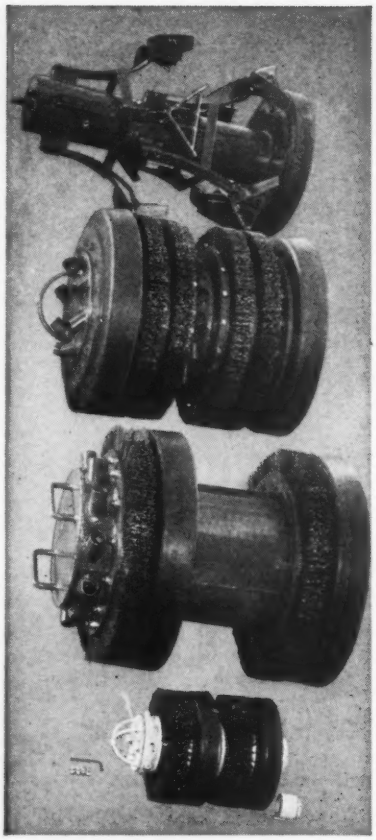

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- (2nd) **Type RN** Pig with 2 sets of rotation nozzles; by-pass gas purges brush bristles; brushes may be shimmed to compensate for wear.
- (3rd) **Type RCN** Pig with single row of rotation nozzles; new compact design for traversing long-radius factory ells. Light weight construction.
- (4th) Small size, **Type RCN** Pig, improved model will negotiate sharp bends; equipped with nozzle plugs for control of by-pass gas.

*Patents pending

THE PIG WITH THE POKE CLEANS PIPE LINES

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TULSA 9, OKLAHOMA

000,000 cu. ft. daily to 425,000,000 cu. ft. Cost of the new facilities has been estimated at $500,300.

Standard of Indiana Builds Peoria Terminal

Standard Oil Co. (Indiana) has recently completed piping for a products terminal at Peoria, Ill., contracted by Midwestern Contractors, Inc., for serving 150 trucks.

Construction of a similar products river terminal is being undertaken by Midwestern Contractors for Standard of Indiana at Cape Girardeau, Mo. The work is being supervised by Claud Wilson, superintendent, and William Daniels, engineer.

Southern California Lays 30-in. Lateral Gas Line

Southern California Gas Co. is laying a 12-mile, 30-in. lateral from Santa Fe Springs to the Pasadena-Alhambra area which is to cost approximately $1,500,000. The project has been contracted by Alex Robertson Co.

In the Alhambra-San Gabriel area, Pacific Pipe Line & Engineers, Ltd., has subcontracted part of the work from Robertson. Welds are inspected by the gamma ray technique. The project is due to be completed early in October.

Moore Station To Pump Billionth Barrel in 1948

Interstate Oil Pipe Line Co.'s Moore station, near Shreveport, La., is expected to pump the billionth barrel of crude oil sometime late this year, according to The Liner, company publication. Started in 1909, Moore station was completed in 1910. Since that time and up to January of this year, Moore station had pumped a total of 959,514,347 bbl. of crude oil.

Moore station handled the oil shipment of run ticket No. 1 of Standard Oil Co. of Louisiana which was signed for the company by R. V. Hanrahan now president of Humble Pipe Line Co.

Transcontinental Order Stands Against Protests

Federal Power Commission declined today to revoke an order of last May 29 authorizing Transcontinental Gas Pipeline Co., Inc., to build a pipe line from the Texas Gulf Coast area and Louisiana to New York City.

The National Coal Association, United Mine Workers of America, Order of Railway Conductors and others, Eastern Gas and Fuel Associates, and Anthracite Institute asked the com-

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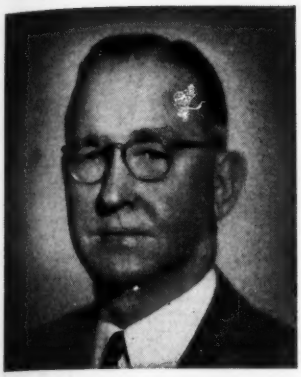

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mission to reconsider the May 29 order.

The commission said there were no new facts or new principles of law to warrant revocation and reconsideration.

Projected Gas Lines To Cost $1,418,000,000

Federal Power Commission as of May 15 had pending hearings on applications involving the laying of 13,515 miles of pipe line. The total mileage already approved and that pending on that date, thus totaled 23,683 miles of natural-gas pipe line.

Total construction would cost more than $1,418,000,000 and would require more than 5,480,000 tons of pipe.

Alabama-Tennessee Headed By William F. Eastep

Alabama-Tennessee Natural Gas Co. is headed by William F. Eastep of Florence, Ala., as president. Alabama-Tennessee is planning two projects totaling 136 miles which include a 75-mile, 10-in. line from a connection with Tennessee Gas Transmission Co. near Selmer, Tenn., to Tuscombia, Ala., and a 61-mile, 6-in. line from Tuscombia to Huntsville, Ala.

FPC Postpones Hearing On Four Applications

A hearing involving applications filed by Atlantic Seaboard Corp., Virginia Gas Transmission Corp., Tennessee Gas Transmission Co., and Commonwealth Natural Gas Corp. for authorization to construct pipeline and other natural-gas transmission facilities, has been postponed until August 10 by the Federal Power Commission.

Atlantic Seaboard and Virginia Gas Transmission Corp. propose joint construction of a 268-mile, 26-in. line from Clendenin, W. Va., to Rockville, Md., at an estimated cost of $20,649,600.

Commonwealth Natural proposes construction of a 537-mile, 20-in. line from Tennessee Gas Transmission Co.'s trunkline at West Bend, Ky., to Norfolk, Va., and lateral lines to Roanoke, Petersburg, Richmond, and Suffolk, Va., at an estimated cost of $29,522,100.

Proposed facilities of Tennessee Gas include about 909 miles of loops along the existing main line, about 395 miles of 26-in. main line from northeastern Kentucky through Ohio and western Pennsylvania to the vicinity of Buffalo, N. Y., compressor units aggregating 91,200 hp., and additional equipment. Cost has been estimated at $118,396,000.

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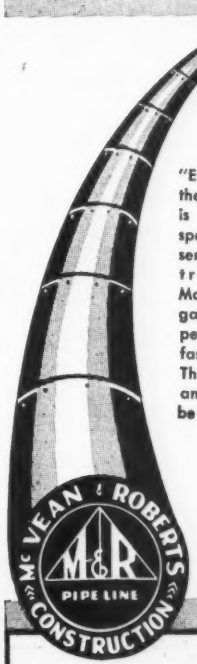

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Among the

Drilling Contractors

Ted Houck, drilling superintendent for **Parker Drilling Co.** of Tulsa, has just completed a deep test on the outskirts of St. Petersburg, Fla. The well is Coastal Petroleum Co. 1 Ed C. Wright which was recently completed as a dry hole after reaching a total depth of 11,507 ft.

Heathman-Honaker Drilling Co. and associates have contract for 1 Schmeidler, NE NE NE 25-12-18, 2 miles east of Koblitz pool, on an 880-acre block in Ellis County, Kansas, purchased recently by Heathman-Honaker and Southwestern Royalty Co. from Ed Madden and A. F. Brann.

J. R. Sharp Drilling Co. has closed its Forth Worth office and has reestablished headquarters in Midland, Texas.

Transit Corp. is drilling below 3,600 ft. at the Anderson-Prichard Oil Corp 1 Dietz, SW SW SW 34-6-23, in northern Graham County, Kansas, 8 miles northwest of Alda pool and 20 miles southwest of Ray pool.

Olson Drilling Co. is rigging up tools at 1 R. C. Murphy in NW NW SW of 12-5s-5w, for a 7,200-ft. test, on acreage obtained by farmout from Stanolind Oil & Gas Co. The Olson wildcat is 3 miles south and 5 miles west of Ringling, Okla., in eastern Jefferson County.

Atlantic Oil Co. has received contracts for two new drilling jobs. First of these is a redrill job for Crown Petroleum Co. at its 1 Exeter-Banning in Wilmington field of Los Angeles County, California. Second contract is to drill the 2 Rowan for O. M. Slosson in the same field.

Harry Gore and **B. & R. Drilling Co.** have operations under way at the 1 Smee, SE SE NW 35-9-19, 1 mile southeast of Zurich townsite pool in Rooks County, Kansas.

Morgan Drilling Co., Midland, Tex., is moving a rotary rig to Throckmorton County, Texas, to drill a 5,000-ft. Ellenburger wildcat, 5 Grisham-Hunter, R. A. Brown estate, 12 miles south of Throckmorton, and 1,267 ft. from south and 330 ft. from west lines of Section 1613, TE&L Survey.

Herndon Drilling Co. is near the prospective pay level at the 1 Gustin, SW NW SW 6-10-16, 3½ miles northwest of Baum pool in southeastern Rooks County, Kansas.

Caprock Drilling Co., of Midland, Tex., is entering the Alberta field, and will operate from offices in Calgary.

Barnes & Shadrick Drilling Co. has been awarded contract for a new wildcat venture in the Newhall area of Los Angeles County, California. The well will be known as the 1 Carter-Earl, 5-3n-15w, and it will be put down for W. J. Carter of Long Beach.

Big Chief Drilling Co. has contract for Shell Oil Co., Inc., 1 J. I. Long, with another well to be commenced in a few weeks at a location approximately 1 mile from the discovery well 1 J. G. Walters, NE SW 14-10n-21w, near Elk City, Okla., in Beckham County.

Corwin Drilling Co. currently is drilling the 1 Hays, 36-4n-16w, for Ned Barmoro. This well is a wildcat venture in the Newhall area northwest of Placerita Canyon, Los Angeles County, California, where a new oil discovery recently was made by Standard Oil Co. of California.

Denman Drilling Co. has contract for Southwestern Exploration Co. 1 Penn Building Co., SE NE NW 22-28n-2e, on the Tierra Amarilla Grant of Rio Arriba County, New Mexico, and is moving in rotary tools. Location is in the northeastern area of the San Juan basin and approximately 35 miles southwest of production in Hughes pool at the northeast corner of the basin.

Severns Drilling Co. is rigging up to drill the 5 Bodger, 22-3s-14w, on contract for British-American Oil Producing Co. Location is in Alondra Park field of Los Angeles County, California.

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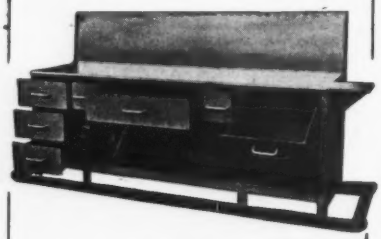

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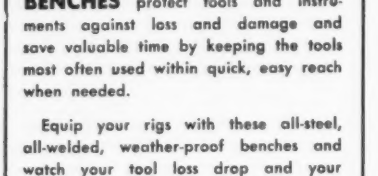

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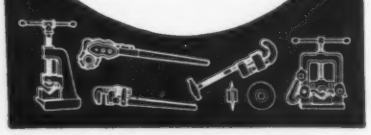

F. B. Paine Drilling Co. Dallas

Growth.—An old-timer in North Texas operations, F. B. Paine Drilling Co. is now rounding out 30 years of contract drilling for Southwestern oil operators. Organized in 1918, principally to drill for the old Lewis Oil Co., the business was conducted as a side line for 10 years by F. B. Paine, who continued in charge of oil operations in the Southwest for the Parker interests.

F. B. PAINE

C. J. PAINE

W. L. PLEMONS

Activity was stepped up in 1928, when a three-way partnership was formed and two new rotary rigs were acquired. With the exception of its participation in the East Texas boom from 1931 to 1937, and later work in Southwest Texas, the company has remained in North Texas to specialize in development of the hundreds of small fields which characterize that area's reserves.

Rigs.—A total of five modern, mediums rotary rigs are now operated in exploratory and field drilling.

Personnel. — The 20-year partnership includes F. B. Paine, the founder; Charles J. Paine, his son, and W. L. Plemons, who supervises all field operations from Wichita Falls. The partners are active in association work, and Charlie is serving his second term as treasurer of A.A.O.-D.C. Tool pushers, all located at Graham, include: Eddie Plemons, R. E. Armitage, Wade H. Orrell, J. D. Lankford, and Olas M. Plemons.

Sidelights. — North Texas, where nearly every test is considered a wildcat, demands careful and close supervision of every drilling operation. This need for close contact in the field led the company to pioneer in the use of FM radio communication, now commonly accepted by many drilling contractors.

Years of operation in North Texas have netted the contracting company an uncounted but impressive list of field discoveries. Among the several relatively important fields, Paine can list Hoefle, Ellis, and Steed in Jack County, and Kendall in Young County, as new discoveries; all drilled for Hanlon-Buchanan, now Warren Oil Corp. The discovery record thus far this year is typical; of some 30 wells completed for Warren, about one-third have opened new production.

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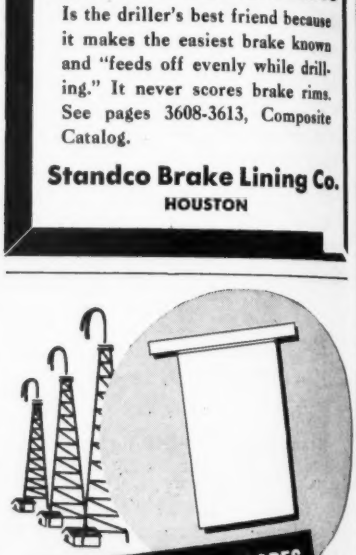

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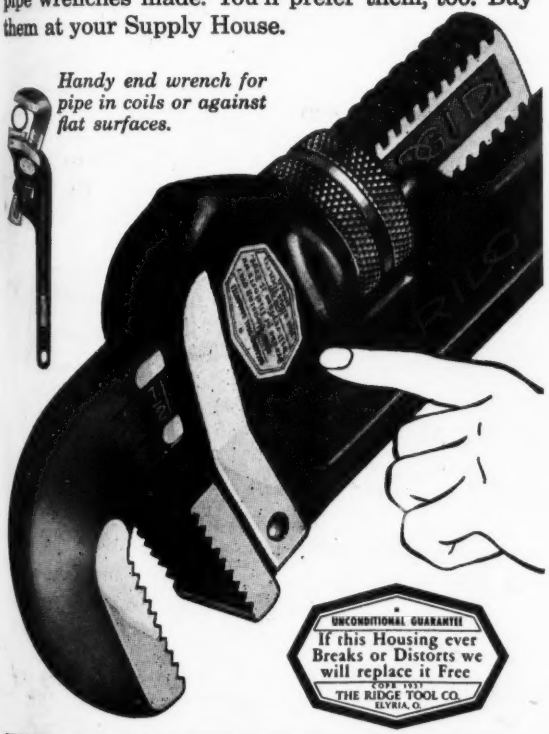
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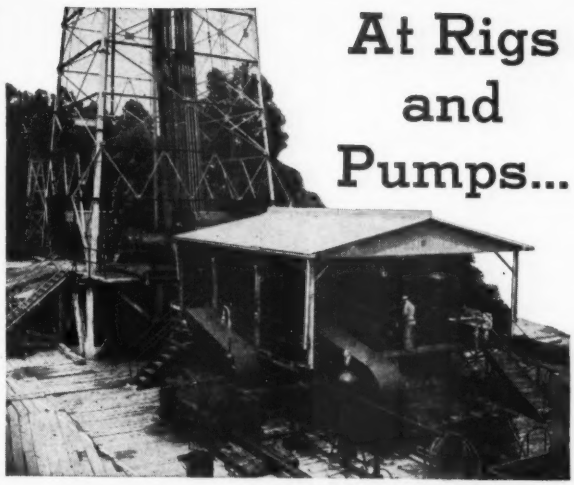

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Exploration and Drilling

Geological Thinking and California Results

THE announcement of the completion of the second, third, and fourth successful wells in the Cuyama Valley Russell area by Richfield Oil Corp., good for 1,000, 300, and 950 bbl. daily initial production, makes a total of six producers on what, only a few weeks ago, were two wildcat prospect areas. The Anderson-Colgrove area, about 2½ miles northwest, already had a second producer.

Today the Cuyama Valley is probably the hottest thing in California from an exploration standpoint. Many geologists point out that this is only the latest event in a series of many, that indicate to geologists that they must maintain an open and inquiring mind.

The Cuyama Valley was first condemned, or at least damned with faint praise, as early as 1915. (See U.S.G.S. Bulletin 621-M). This might be excusable, since petroleum geology was practically in its infancy then. In fact, some of the geologists, who were students in California in those days, claim that as students they were taken on field trips to Cuyama Valley. For what purpose? Believe it or not, they claim it was to show them a type locality where anticlines would produce no oil.

But as recently as the July 1939 California Journal of Mines and Geology, an article again gave Cuyama rather short shrift. Yet cross-sections given in both the 1915 and 1939 articles, to present-day geologists look like extremely favorable conditions. Nor is this altogether hindsight; similar conditions have been repeatedly described in prescribing the kind of conditions favorable for oil accumulation.

Fortunately for the reputation of the petroleum geologists, there was already a well-established trend toward stimulating a professional attitude of more openmindedness about where oil fields might be found. It was a reflection of this trend that determined the nature of the fields described in the new A.A.P.G. Volume III, Structure of Typical American Oil Fields, just out. Quoting from the editor's foreword: "In the present volume an effort has been made to include fields that are in some way unusual, either in size, type of structure, discovery method, location, or significance. Each field may be said to 'point a moral, or adorn a tale.'"

For example, the very existence of the Gramps (or Price) oil field in Archuleta County, on the southern border of Colorado, is a challenge to both the geophysicist and the geologist. Gramps was at one time buried under several hundred feet of Tertiary volcanic rocks, and probably would still be unknown, were it not for the lucky chance of a canyon exposure in the Chama River.

There are thousands of square miles in the northwest United States now covered with volcanics of rather late geological age. No responsible geologist, in estimating possible undiscovered reserves, as of now, dares to assign even a tentative figure for this area. But Gramps proves there is no reason why there should not be such fields. If someone can devise a way of peering through these surface volcanics to get a glimpse of the structure of the sedimentary rocks below, who knows what we will find?

There are other problems and indications of types of oil fields that probably are waiting to be discovered, if the right geological or geophysical key can be found. With Cuyama Valley as a fresh stimulus, thinking along these lines will probably increase.

HIGHLIGHTS OF WEEK'S DEVELOPMENTS

SOUTH LOUISIANA.—The Texas Co. 111 Leeville-L.L. & E. in the Leeville field of Lafourche Parish was completed flowing 303 bbl. of 29.5°-gravity oil daily, through perforations at 14,074-87 ft. to open the deepest producer in Louisiana and one of the deepest in the world.

ROCKY MOUNTAIN AREA.—In the Powder River Basin, Bay's Lodgepole discovery, Weston County, Wyoming, swabbed 60 bbl. of oil and 110 bbl. of water in 24 hours, and the second test failed to find saturation in the Dakota. Tensleep showed oil on drill-stem test at the Ohio-Stanolind Enos Creek deep test. Stanolind and Frontier Refining topped granite, missing the Weber, at the Bar-X wildcat in Grand County, Utah. The well may be completed as a gas discovery in the Morrison.

WEST TEXAS.—Seaboard Oil Co. 1 Hirson, Terry County wildcat has promises of becoming an important discovery, from the Cisco limestone of the Pennsylvanian. Gulf's ½ mile west offset and second well in the C-Bar field, Crane County, has production in the Connell sand of the lower Simpson, as well as the Silurian, and will be a dual completion. It flowed 42½ bbl. of oil in 7½ hours, through ¾-in. choke. Upton County's 1 Pray-State has plugged back to test the Cleark Fork section.

NORTH TEXAS.—In Throckmorton County, on the old Titus townsite, Woodley Petroleum Co. 1 Hughes had flowing oil on a drill-stem test of an unidentified section at 4,121-36 ft. It will drill ahead to the Mississippi. Location in TE&I Survey 902 was the scene of shallow production some 20 years ago, when drillers refused to go deeper on the assumption that Stephens County's boom-day fields had drained it all off. Cities Service 1 Sealy and Kingwood 2 Garrett made flowing potentials of 621 bbl. and 434 bbl. of oil, to further extend the northwest Chico field's producing area.

CALIFORNIA.—A "grass roots" oil pool was discovered by the Tejon Hills Oil Co. at it 2 Tejon Ranch, 10-11n-18w, Kern County. The well produced more than 175 bbl. of fair gravity crude from a 27-ft. pay interval topped at 380 ft.

KANSAS

Possible Pool Opener For Rooks County

THE southeastern corner of Rooks County has a prospective pool opener at Cities Service Oil Co. 1 Krueger, SE SE SE 35-10s-16w. The well swabbed 110 bbl. of oil and 12 bbl. of water in 12 hours from perforations in the Lansing-Kansas City lime at 3,372-3,544 ft. Lansing was topped at 3,255 ft. and casing set to 3,575 ft. after hole had been carried to 3,682 ft. Test was made after an acid treatment of 1,000 gal. The well is located about 3½ miles northeast of the Bemis-Shutts pool and about the same distance northwest of the Fairport pool.

In the area about 1¼ miles north of the Stafford pool, B. & R. Drilling Co. & Delta Production Co. have perforated casing opposite the Arbuckle at 1 Hildebrand, NW NW SE 2-24s-12w, for production of about ½ bbl. per hour and were preparing to treat with acid. The Arbuckle was topped at 3,955 ft. and casing perforations made at 3,954-60 ft. If the operator fails to get commercial production in the Arbuckle, the Viola will be tested, since this zone had a good gas show on an early drill-stem test.

Atlantic Refining Co. 1 McDonald, NE SW SW 11-21s-13w, Stafford County, had 200 ft. of oil in the hole after drilling plug. Casing was set on top of the Arbuckle at 3,520 ft. The well is east of the Rothgarn pool but is separated from the pool by a dry hole.

Alpine Oil & Royalty Co. has run casing at 1 Douglas, CEL SE NW 23-34s-2w, Sumner County, near the original well of the abandoned Corbin pool. A 30-minute drill-stem test of the Simpson sand at 4,475-80 ft. had a good show of gas and recovered some free oil along with oil-cut mud.

Sinclair-Prairie Oil Co. 1 Von DeGeer, NW NW SE 2-33s-15w, Barber County, is showing for one of the best wells to be tested in the recently opened DeGeer pool. Production is from the Viola through perforations at 5,166-78 ft. Following acid treatment, the well flowed 42 bbl. the first hour and 50 bbl. the second hour through ¾-in. choke, and then averaged 38 bbl. per hour for 6 hours through ½-in. choke.

New locations for the week totaled 64. Rice County led the state with nine new spots followed by Rooks, Stafford, and Stevens with five each.

KANSAS SUCCESSFUL WILDCAT

Barton County: The Texas Co. 1 Trester, SW SW SW 21-18s-13w, produced 28 bbl. of oil per day from Arbuckle at 3,371-75 ft.; anhydrite 790 ft., Topeka 2,750 ft., Heebner 2,981 ft., lime 3,135 ft., conglomerate 3,365 ft., TD 3,389 ft.

KANSAS WILDCAT FAILURES

Barber County: Maguire 1 Gypsum, C NW SE 9-31s-15w, dry, TD 4,922 ft., lime 4,000 ft., Viola 4,661 ft., Simpson 4,818 ft., Arbuckle 4,869 ft.

Barton County: Cities Service 1 Skolut, NE NE SW 14-18s-14w, dry, TD 3,450 ft., Heebner 3,095 ft., lime 3,133 ft., Arbuckle 3,440 ft.

N. C. R. A. et al 1 Rudiger, NE NE NE 16-20s-14w, dry, TD 3,645 ft., anhydrite 830 ft., Topeka 2,870 ft., Heebner 3,160 ft., lime 3,273 ft., basal Kansas City 3,490 ft., conglomerate 3,515 ft., Arbuckle 3,621 ft., no shows.

Pratt County: Lion Oil Co. 1 Kenzie, SE SE SW 23-29s-13w, dry, TD 4,724 ft., Douglas 3,743 ft., lime 3,887 ft., Mississippian 4,358 ft., Viola 4,464 ft., Simpson shale 4,567 ft., Simpson sand 4,577 ft., Arbuckle 4,669 ft.

Rooks County: Continental 1 Berland, NE NE SE 28-8s-20w, dry, TD 3,601 ft., lime 3,358 ft., Arbuckle 3,550 ft.

Cooperative Refinery 1 Harlan, SE SE NW 5-7s-19w, dry, TD 3,535 ft., anhydrite 1,530 ft., Heebner 3,166 ft., lime 3,209 ft.

Appleman 1 Henderson, SE SE SW 29-8s-18w, dry, TD 3,505 ft., lime 3,208 ft., Arbuckle 3,457 ft.

CALIFORNIA

Tejon Hills Area Gets New Shallow Field

LOS ANGELES.—Another astonishing discovery for California has been reported in the Tejon Hills area of Kern County by Tejon Hills Oil Co. This new field is not of such great interest from the standpoint of high initial production from the discovery well as it is from the standpoint of the very shallow depth at which the oil was found. The discovery was made known this week when the company announced that it had completed its 2 Tejon Ranch, 10-11n-18w, for 175 to 200 bbl. of 30.8°-gravity oil daily from 27 ft. of oil sand found in the interval 380-407 ft. This interval is believed to be the Santa Margarita and Lower Chanac. The company does not believe, however, that the discovery well has penetrated the entire oil zone and is of the opinion that subsequent wells in the area may have even greater output.

A geologic study of the area several years ago indicated that a possible producing sand might be found at a depth of approximately 800 ft. Consequently, the company's first well in the area, the 1 Tejon Ranch, went entirely through the oil zone and attempted to blow out before operators knew they had hit a sand. Due to the threatened blowout, the well was plugged full length and abandoned 3 weeks ago before starting the 2 Tejon Ranch. A third well has now been started and casing has been cemented.

Tejon Hills Oil Co. holds approximately 1,580 acres of leases surrounding the discovery well. This block is located about 7 miles northeast of Tejon Ranch field, which was discovered in 1935 by Reserve Oil & Gas Co.

Richfield Oil Co., which is proceeding with a rapid development campaign in the new Cuyama Valley field of San Luis Obispo and Santa Barbara counties, has announced completion of three excellent producers on its Russell lease in the latter county. These new wells include: the 18-5 Russell, 5-10n-27w, which came in flowing at a rate in excess of 1,000 bbl. daily; the 11-8 Russell, 8-10n-27w, completed for approximately 300 bbl. daily; the 31-8 Russell, 8-10n-27w, which flowed approximately 950 bbl. daily. Completion of these wells brings the total of producing wells in the Cuyama Valley for Richfield to six. Four of these are located on the Russell properties and two on the Anderson properties about 2½ miles to the northwest. There is one other producing well in the Valley, a 200-bbl. pumper completed early this year by the Norris Oil Co. Richfield Oil Corp. currently has seven drilling wells and one location in the Cuyama Valley.

CALIFORNIA SUCCESSFUL WILDCATS

Kern County, McDonald anticline area: Independent Exploration Co. 4 Layman One, 18-28s-20e, pumped 25 bbl. daily, gravity 24.2°, water cut 0.2 per cent, elev. 1,029 ft., TD 1,430 ft.

Wheeler Ridge area: Richfield Oil Corp. 12-28 Gordon, 28-11n-20w, pumped 58 bbl. in 14 hours, gravity 22.5°, water cut 3 per cent, 314 ft. perf. liner landed 1,262 ft., elev. 1,426 ft., TD 1,264 ft.

Los Angeles County, El Segundo area: Standard Oil Co. of Calif., 5 Six Companies, 2-3s-15w, pumped 86 bbl. daily, water cut 16.5 per cent, elev. 123 ft., TD 6,967 ft.

Elsmere area: Standard Oil Co. of Calif. 1 Placerita, 6-3n-15w, pumped 8 bbl. net oil daily, elev. 1,403 ft., TD 821 ft.

Monterey County, San Ardo area: The Texas Co. 4 Rosenberg, 34-22s-10e, pumped 6 bbl. daily, water cut 80 per cent, elev. 490 ft., TD 2,181 ft.

Santa Barbara County, Olivera Canyon area: Union Oil Co. 2-28 Wicker den, 28-9n-32w, on pump, no production estimate, elev. 743 ft., TD 5,000 ft.

Solano County, Rio Vista area: D. D. Feldman 1 Maria, 3-3n-3e, IP 1,527,000 cu. ft. gas, shut-in casing pressure 1,621 psi., shut-in tubing pressure 1,623 psi., elev. unknown, TD 4,605 ft.

Ventura County, Shields Canyon area: T. & T. Oil Co. 1-A Hickler, 22-4n-19w, on pump, no production estimate, 233 ft. perf. liner landed at 2,933 ft., elev. 1,950 ft., TD 3,497 ft.

CALIFORNIA WILDCAT FAILURES

Kern County, Blackwells Corner area: The Superior Oil Co. 3 O.L.C., 31-26s-19e, dry, elev. 802 ft., TD 2,553 ft.

Oildale area: B. F. Peters et al 1 Callagy, 21-29s-28e, dry in gray sand, elev. 588 ft., Santa Margarita Transsition zone 2,689 ft., TD 2,723 ft.

Los Angeles County, Alondra Park area: British-American Oil Producing Co. 2 Village Comm., 22-3s-14w, dry, elev. 64 ft., TD 9,472 ft.

East Los Angeles area: Richfield Oil Corp. 17-1 Boyle Comm., 35-1s-13w, dry, elev. 284 ft., TD 5,868 ft.

Santa Barbara County, Cuyama Valley area: Federal Oil Co. 1 Pacific-Continental, 25-11n-28w, dry, elev. 1,837 ft., TD 3,477 ft.

Frank & von Glahn 2 Indian, 23-11n-28w, dry, elev. 1,762 ft., TD 4,133 ft.

East Lompoc area: Union Oil Co. 1 Santa Rita, 12-7n-33w, dry, elev. 1,460 ft., TD 3,600 ft.

MISSISSIPPI

Warren County Well Finds New Salt Dome

JACKSON.—A new piercement salt dome for Mississippi was discovered this past week when The California Co. 1 Mattie H. Johnston, Section 15-16n-3e, Warren County, approximately 3 miles northwest of Vicksburg, encountered Cap Rock at 4,356 ft., and salt at 4,386 ft. Approximately 30 ft. of tight, laminated sand and shale with show of oil was cored in the Wilcox. Core analysis showed only 50 millidarcy feet of permeability in this section and operators consider it to be too tight to be of commercial value.

In Baxterville field of Lamar County, Southeastern Drilling Co. 1 G. Holston, 18-1n-16w, was completed on pump for initial production of 250 bbl. of oil plus 17 per cent salt water per day. Total depth is 8,880 ft.

Sun Oil Co. 1 Arrington unit, 10-7n-7e, in Brookhaven field, Lincoln County, was completed pumping 117 bbl. per day. Total depth 10,450 ft. Production is through perforations at 10,422-60 ft.

The California Co.-Humble Oil & Refining Co. 1 Luther Bowman et al, Unit 1, 19-6n-8e, in Mallalieu field of Lincoln County, was drilled to a total depth of 10,521 ft., and was completed flowing an initial production of 404 bbl. of 38.6°-gravity oil per day through an 11/32-in. choke, tubing pressure 250 psi. Same company's 1 Luther Bowman et al, Unit 2, 20-6n-8e, also in Mallalieu field, was completed flowing 362 bbl. of oil per day through a 17/64-in. choke, tubing pressure 315 psi. Production is through perforations at 10,430-66 ft.

In Yellow Creek field of Wayne County, Magnolia Petroleum Co. 1 U. L. Busby, 19-9n-7w, was completed on pump for 204 bbl. of oil per day. Total depth is 5,324 ft., with production from City Bank sand topped at 5,010 ft.

Two wildcat locations were reported, 1 each in Attala and Lauderdale counties. Nine development locations were 4 in Baxterville field, Lamar County; 2 each in

Heidelberg and Mallalieu fields, and 1 in Cranfield field, Adams County.

FLORIDA WILDCAT FAILURE

Gadsden County: Paul W. Olds & John W. Maylor 1 Florida Powder Co., in center NE NW 35-2n-3w, dry, TD 4,240 ft.

OKLAHOMA

Payne County Wildcat Makes Good Well

TESTS at Callery & Hurt 1 Blumer, SE NW SE 28-18n-2e, Payne County, indicate that the wildcat will make a good oil well. Oil flow on test was 66 bbl. in 11½ hours through ¼-in. choke and operator expects it to increase when well is cleaned up. Casing was set at 4,323 ft. and hole is open to total depth of 4,372 ft., including the Skinner sand at 4,321-38 ft. and Red Fork sand at 4,358-72 ft. Plans for offset drilling have been started which may include a test of the Wilcox.

British American Oil Producing Co. appears to have Wilcox production at its Grant County well north of Webb pool. The well, 1 Cornell, NE NE NW 24-28n-3w, found the Wilcox at 4,685 ft. and a 13-minute drill-stem test at 4,685-93 ft. flowed gas and oil and recovered 630 ft. of 42.9°-gravity oil. Casing has been set to 4,285 ft. for further tests.

In Logan County, Midstates Oil Corp. 1 Abrams, NW NW SW 32-19n-4w, is showing for a Wilcox producer. After the plug was drilled, the well averaged 34 bbl. per hour for 3 hours through ¾-in. choke with tubing pressure at 150 psi. The Wilcox was called at 6,058 ft. and total depth is 6,088 ft. The well is southwest of the Marshall pool.

Phillips Petroleum Co. has Bartlesville production at 1 Ralph, NE NE NE 17-15n-1e, Logan County, a south offset to the discovery well of Evansville East which was completed in May. A drill-stem test of the Bartlesville sand at 4,998-5,003 ft. had gas at once and oil in 4 minutes flowing at the rate of 30 bbl. per hour.

Frank B. Murta has set casing at 1 Ida Ellis, SE NW SE 6-9n-11e, Hughes County, for tests of the three possible producing zones found by the well. The Booch sand at 3,060-3,105 ft. showed for 5,000,000 cu. ft. of wet gas. The Hunton show was recovery of 150 ft. of oil-cut mud and some free oil on a 1-hour drill-stem test. Wilcox sand was drilled at 3,976-85 ft. with the top 6 ft. hard and tight but the bottom 3 ft. softened and carried staining and odor.

OKLAHOMA SUCCESSFUL WILDCATS

Carter County: Samedan 1 Hedges, NW NE NE 14-5s-1e, produced 2,818,000 cu. ft. of gas per day from sand at 2,715-3,133 ft., TD 6,004 ft.

Garvin County: Phillips 1 Hillman, NW SW SW 3-2n-2w, flowed 94 bbl. of 42°-gravity oil per day through 3/64-in. tubing choke from Gibson sand at 6,550-75 ft., TD 7,145 ft.

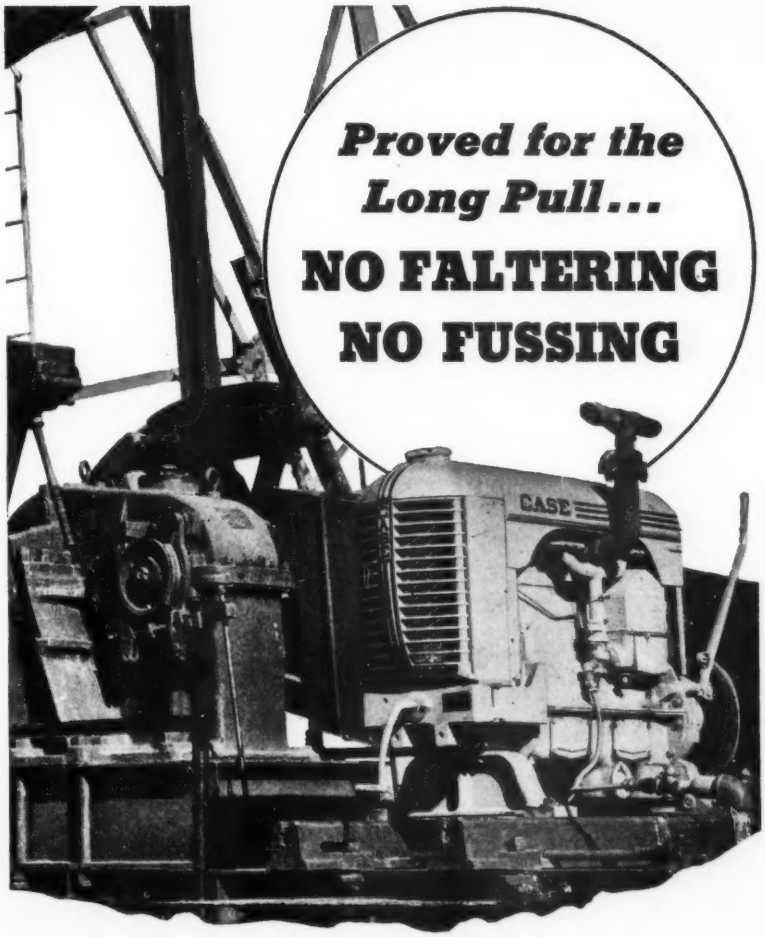
Lincoln County: Blackwell 1 Hausman, SW SW NW 29-16n-5e, flowed 10 bbl. of oil per day from Prue at 3,568-3,614 ft., TD 4,426 ft.

OKLAHOMA WILDCAT FAILURES

Alfalfa County: Texas 1 Maxwell, NE NW NE 18-28n-12w, dry, TD 6,050 ft., Pawhuska 3,045 ft., Layton 4,208 ft., Checkerboard 4,456 ft., basal Oswego 4,703 ft., Mississippi lime 4,992 ft., Woodford 5,355 ft., Sylvan 5,462 ft., Viola 5,506 ft., Simpson sand 5,640 ft., Arbuckle 5,846 ft.

Comanche County: Gilliland 1 Smith, SW SW SE 21-1n-15w, dry, TD 806 ft. in granite wash.

Cotton County: Wilder 1 Price, SE NW NW 35-5s-12w, dry, TD 2,015 ft., fusilinid 1,744 ft., Megargle 1,804 ft., sand 1,830 ft. Peckham 1 Sessums, NW NW NE 25-5s-13w, dry, TD 2,007 ft., sand 1,624 ft., fusilinid 1,834 ft., Megaargle 1,930 ft.



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CASE

Creek County: Mid-Continent 1 Lowe, SW SW NE 15-14n-7e, dry, TD 3,345 ft., Oswego 2,648 ft., Prue 2,697 ft., Red Fork 3,159 ft., Bartlesville 3,284 ft.

Greer County: Staley 1 Bowen, SW NE SW 33-5n-21w, dry, TD 1,926 ft., granite 1,920 ft.

Hughes County: Sohio 1 Bartlett, SE NE NW 26-5n-9e, dry, TD 4,430 ft., no tops reported.

Maguire 1 Downey, SW SW NE 34-6n-8e, dry, TD 3,512 ft., Senora lime 1,226 ft., Senora sand 1,262 ft., lower Senora sand 1,323 ft., Hartshorne coal 2,978 ft., Hartshorne sand 2,985 ft., Gilcrease 3,172 ft., Gilcrease sand 3,282 ft.

Davon 1 Robinson, SW SE SE 7-8n-12e, dry, TD 4,420 ft., upper Booch 2,073 ft., lower Booch 2,216 ft., Gilcrease 2,593 ft., Union Valley 3,242 ft., Cromwell 3,310 ft., Viola 4,240 ft., second Wilcox 4,352 ft.

Kiowa County: Reynolds 1 McDonald, SE SW SE 22-6n-20w, dry, TD 792 ft., no tops reported.

Lincoln County: Lynn 1 Savage, W/2 W/2 NW 14-14n-4e, dry, TD 3,907 ft., Oswego 3,746 ft., coal 3,775 ft., lower Prue 3,832 ft., Verdigris 3,890 ft.

Logan County: Falcon 1 Moore, SW SW SE 23-15n-1e, dry, TD 5,508 ft., Avant 3,168 ft., Hogshooter 3,745 ft., Layton 3,781 ft., Checkerboard 4,022 ft., Verdigris 4,706 ft., Red Fork 4,853 ft., Woodford 5,001 ft., Hunton 5,048 ft., Sylvan 5,154 ft., Viola 5,254 ft., Wilcox 5,435 ft., second Wilcox 5,494 ft.

Major County: Superior 1 Jantz, NE SW NE 20-22n-9w, dry, TD 6,900 ft., Manning sand 6,664-84 ft., Mississippi lime 6,885 ft.

Osage County: Continental 1 Osage, NW NW SE 35-23n-6e, dry, TD 3,243 ft., brown lime 2,270 ft., Mississippi lime 2,790 ft., Woodford 2,946 ft., Simpson 2,962 ft., Arbuckle 3,176 ft.

Pottawatomie County: Alpha 1 Sukovaty, NW NW SE 21-11n-6e, dry, TD 4,630 ft., Avant 1,303 ft., Hogshooter 1,695 ft., Layton 1,793 ft., Checkerboard 2,064 ft., conglomerate 2,103 ft., Big lime 2,300 ft., Oswego 2,525 ft., Prue 2,842 ft., Verdigris 2,882 ft., Skinner 2,905 ft., Red Fork 3,330 ft., Inola 3,600 ft., Bartlesville 3,620 ft., Booch 3,780 ft., unconformity 3,840 ft., basal Pennsylvanian-Caney 3,865 ft., Mayes 4,060 ft., Woodford 4,130 ft., Misener 4,260 ft., Hunton 4,264 ft., Sylvan 4,420 ft., Viola 4,510 ft., Simpson 4,558 ft., Wilcox 4,581 ft., second Wilcox 4,632 ft.

Stephens County: Stephens 1 Grooms, NW NW SW 16-1s-6w, dry, TD 9,529 ft., Hoxbar 4,445 ft., Deese 6,700 ft., conglomerate 7,948 ft., lower Deese 7,350 ft.

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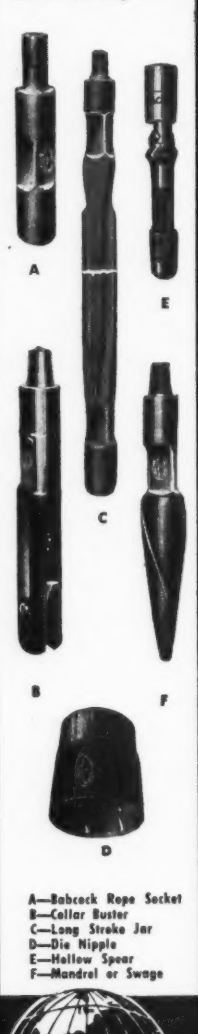

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MICHIGAN

Active Week Records 13 Wells in Michigan

SAGINAW.—Initial daily potential of 3,700 bbl. from 13 new producing wells, of which three were wildcats, marked a week of seasonal peak activity in Michigan oil and gas fields. Of the 28 completions, 2 others were gas wells and 13 were dry holes, 9 other wildcat failures among them. Activity continued with 25 new locations announced for operations in 14 counties.

In addition to Gulf Refining Co. 1 State-Sylvan discovery in Osceola County, Superior Oil Co. announced a valuable discovery in Eden Township, Mason County, which flowed 30 bbl. in a 3-hour test after acidizing. The 1 Sippey came in from the Traverse limestone at 1,817 ft. It is in Section 26. Superior already has started operations on two offsets. The third wildcat producer flowed 200 bbl. a day, acidized, from the Traverse at 1,513 ft. in Heath Township, Allegan County. It is the H. W. Lang Co. 1 Heck.

Among the other 10 producers was another in Pentwater field, Oceana County, that came in for 50 bbl. an hour and an Isabella County completion that flowed 60 bbl. on a 2-hour test.

The new locations include six in Allegan County, three in Oceana, two each in Crawford, Arenac, Mecosta and Montclam, one each in Van Buren, Ionia, Mason, Isabella, Midland, Kalamazoo, Ottawa and Bay. The Crawford locations are in Beaver Creek Township where Pure Oil Co., developing the deep production field, last week completed two wells at 4,385 and 5,360 ft. for after-acid production of 90 and 45 bbl., respectively.

MICHIGAN SUCCESSFUL WILDCATS

Allegan County, Heath Township: J. W. Lang Co. 1 John Heck, SE SW SE 11-3n-14w, flowed 200 bbl. a day, acidized, in Traverse limestone, TD 1,513 ft.

Mason County, Eden Township: Superior Oil Co. 1 Bertram W. Sippey et al, SE SE NE 26-17n-16w, flowed 30 bbl. in 3 hours, acidized, in Traverse limestone, TD 1,817 ft.

Osceola County, Sylvan Township: Gulf Refining Co. 1 State-Sylvan, NW SE SW 9-18n-7w, 30 bbl. hourly potential, acidized, in Dundee-Dolemite, TD 3,938 ft.

MICHIGAN WILDCAT FAILURES

Allegan County, Overisel Township: Ford Oil Co. 1 John Berghorst, NE SE NW 4-4n-14w, dry in Traverse limestone, TD 1,525 ft.

Hopkins Township: Leonard C. Sleep-Stanley L. Findley 1 Chester Bostwick, NE SE SE 26-3n-12w, dry in Traverse limestone, TD 1,750 ft.

Kent County, Algoma Township: Socony-Vacuum Oil Co., Inc., 1 Rozella Yodey, SW SE SE 3-9n-11w, 3-9n-11w, dry in Traverse limestone, TD 2,352 ft.

Mason County, Logan Township: George G. Hannes 1 Jerry Vasicek, NW SE SE 16-17n-15w, dry in Sylvania, TD 3,381 ft.

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Montcalm County, Bloomer Township: Mercer Oil Co. 1 Blacker, SW SW NW 26-9n-5w, dry in Dundee, TD 3,140 ft.

Newaygo County, Big Prairie Township: Sun Oil Co. 4 Consumers Power Co., SE SE NE 31-13n-11w, dry in Detroit River, TD 3,175 ft.

Brooks Township: H. E. Walton 1 Ray Kiedro, NE SE SE 5-12n-12w, dry in Traverse limestone, TD 2,435 ft.

Ensley Township: Smith Petroleum Co. 1 Jonas C. Birman, NE NE NW 18-11n-11w, dry in Marshall, TD 991 ft.

Van Buren County, Arlington Township: Stuart L. Godfrey 1 Edward M. Glista, SE SE SW 29-2s-15w, dry in Traverse limestone, TD 1,140 ft.

N. CENTRAL TEXAS

Drilling in Throckmorton County Continues Active

WICHITA FALLS. — Drilling in Throckmorton County was holding a high pace, both in fields and new exploration. Four miles northwest of Throckmorton, Fred M. Manning, Inc., 2 Manning-Harrington unit, BBB&C Survey, recovered 1,980 ft. of oil plus 60 ft. of oil-cut mud on a 34-minute drill-stem test of the Caddo at 3,912-39 ft. Gas came to the surface in 6 minutes and oil in 32 minutes. It was to drill ahead to test lower formations.

In the northwest corner of the county, Warren Oil Corp. 1 Hill-Allen, R. Sanchez Survey, was apparently a failure at total depth of 5,688 ft., according to some reports. It had the Canyon at 2,804 ft., KMA sand at 4,150 ft., Caddo at 5,058 ft., Mississippi at 5,389 ft., and the Ellenburger at 5,675 ft., with no shows revealed.

In southeast Throckmorton, J. D. Sandefer, Jr., et al 1 Gardner, Block 2, GC&SF Survey, recovered 200 ft. of oil-cut mud, plus some salt water, on a 2-hour drill-stem test in the conglomerate from 3,938-46 ft. It had oil showings in drilling from 3,988-97 ft., and a 1-hour test of that section recovered 40 ft. of drilling mud. It was drilled to 3,998 ft., then plugged back to test from 3,244-60 ft., apparently in the Caddo limestone.

In Manning-Parrott field, Strawn sand production was extended ½ mile southwest at Lester & Duffield 1 J. C. Odom, Block 964, TE&L Survey, which completed on the pump for 87 bbl. of oil a day from 2,553-56 ft. Total depth was 2,570 ft.

A second producer in the new Kleiner Mississippi field north of Cisco in Eastland County has been completed. Lone Star Producing Co. 4-A Mrs. J. E. Kincade, Section 81, Block 4, H&TC Survey, produced 310 bbl. of 43.8°-gravity oil a day through 16/64-in. choke, from casing perforations at 3,910-75 ft. The well entered the lime at 3,722 ft. and drilled to 4,037 ft., showing oil and gas for most of the section. The area was also given its fifth outpost at Hickock Producing & Development Co. 4 C. J. Kleiner, ¼ mile west of the Kincade well, in Section 83.

In West Central Texas, District 7-B, 39 new locations were reported for the week. Of these, 18 were wildcats and 21 were in proven areas.

In North Central Texas, District 9, 65 new locations were made during the week, including 21 wildcats.

NORTH CENTRAL TEXAS (DISTRICTS 9 & 7-B) SUCCESSFUL WILDCATS

Callahan County: Ungren & Frasier 1 W. E. Milliorn, Sec. 20, BBB&CRR Sur., 6 mi. SW Clyde, flowed 94.4 bbl. 38.7°-gravity oil in 11 hours, ½-in. choke, sand 1,322-30 ft., TD, tubing pressure 20 psi., GOR 110 cu. ft.

Montague County: Continental Oil Co. 1 S. W. Kennedy, Sec. 27, ETRR Sur., 4 mi. SE Montague, flowed 58 bbl. 42°-gravity oil in 3 hours, ½-in. choke, tubing pressure 125 psi., GOR 675 cu. ft., topped Caddo 6,182 ft., perf. 6,180-6,218 ft., 6,226-65 ft., TD 6,626 ft., PB 6,330 ft.

Throckmorton County: Lester & Duffield 1 J. C. Odom, Sec. 964, TE&L Sur., 2 mi. NW Woodson, pumped 87 bbl. 41°-gravity oil a day, sand pay 2,553-56 ft., TD 2,570 ft.

Young County: Warren Oil Corp. 1 Sweeney, Sec. 2,379, TE&L Sur., 4 mi. N Murray, flowed 252 bbl. 42°-gravity oil a day, 32/64-in. choke, conglomerate 4,305-11 ft., TD, tubing pressure 300 psi., casing 875 psi., GOR 397 cu. ft.

NORTH CENTRAL TEXAS (DISTRICTS 9 & 7-B) WILDCAT FAILURES

Archer County: Carl Childs 2 J. M. Black, Sec. A-5, Allison Arms Sur., 13 mi. SW Archer City, dry, TD 1,213 ft., slight odor 1,191-1,200 ft.

W. B. Hamilton 1 J. J. Perkins, Sec. 1,888, TE&L Sur., 8 mi. SE Archer City, dry, TD 3,353 ft., show oil 3,274 ft.

Clay County: Bridwell Oil Co. 6 H. C. Edrington estate "A," C. H. Stearne Sur., 9 mi. W Petrolia, dry, TD 1,997 ft., Canyon lime 1,972 ft.

S. D. Johnson 1 Mattie Wilson, Blk. 38, J. H. Belcher Subd., ½ mi. E Deer Creek, dry, TD 5,127 ft., sand with oil show 4,507 ft.

Brown County: E. K. Burt & J. C. Man 1 Joe Allwood, Blk. 29, H. P. Brewster Sur., 6½ mi. SW Rising Star, dry, TD 1,553 ft. in shale.

Comanche County: W. F. Collins 1 E. K. Miears, Sec. 56, HT&C Sur., 7 mi. NW DeLeon, dry, TD 3,200 ft., Mississippi 3,154 ft., Ellenburger 3,195 ft. elev. 1,380 ft.

A. B. Edwards 1 J. C. Cook, Sec. 21, D&DA Sur., 4 mi. SW Gorman, dry, TD 2,869 ft., Caddo 2,538 ft., Marble Falls 2,702 ft., elev. 1,306 ft.

Cooke County: W. O. Russell 1 W. R. Thornton, L. C. Gibbs Sur., 2½ mi. SE Bulcher, dry, TD 1,333 ft. in sandy lime with show of oil.

Fisher County: H. H. Coffield 1 G. R. Carpenter, Sec. 207, Blk. 3, H&TC Sur., 1½ mi. E Claytonville, dry, TD 7,053 ft., Strawn 5,910 ft., Ellenburger 6,810 ft., driller's tops, elev. 2,079 ft.

Standard Oil Co. of Texas 1 Schubert, Blk. 2, Sec. 322, James Leggett Subd., Bastrop CSL, 5 mi. E Roby, dry, TD 6,214 ft., Noodle Creek 3,100 ft., Swastika lime 3,915 ft., Chappel lime 6,045 ft., Ellenburger 3,123 ft., elev. 1,858 ft.

Union Oil Co. 1 Lela Nash, Blk. 11, League 307, El Paso CSL, 6 mi. W Roby, dry, TD 6,846 ft., Ellenburger 6,797 ft., elev. 2,105 ft., perf. 6,787-6,810 ft., swabbed 2½ bbl. oil and 2½ bbl. water an hour, squeezed, reperforated 6,811-31 ft., acidized, tested some oil and salt water.

Hardeman County: R. H. Alexander & Cecil Porter 3 W. F. Williams, Blk. H, HW&-NW Sur., 12 mi. N Goodlett, dry, TD 805 ft. in shale.

Jones County: Humble Oil & Gas Co. 1 W. C. Johnson, Sec. 92, Blk. 1, BBB&-CRR Sur., 11 mi. SW Stamford, dry, TD 5,020 ft.

Wm. H. Hunt trust 1 M. L. Bremont, Sec. 40, Blk. 2, SPRR Sur., 11 mi. S Hamlin, dry, TD 3,509 ft., Dotham 2,630 ft., Noodle Creek 2,745 ft., Saddle Creek 2,955 ft., Swastika sand 3,489 ft., elev. 1,936 ft.

Haynes B. Ownby 1 F. E. Barnes, Stephens Scallorn Sur. 280, 5 mi. W Noodle, dry, TD 4,613 ft., Noodle Creek 2,530 ft., elev. 1,804 ft.

Randall et al 1 Ida L. Weaver, Sec. 6, Blk. 17, T&PRR Sur., 2½ mi. SW Truby, dry, TD 3,530 ft., Flippen 2,415 ft., Cook sand 2,520 ft. with show of oil.

Roark, Hooker & Roark 1 C. M. Caldwell, M. Fragosa Sur., 7 mi. SW Anson, dry, TD 3,563 ft., Saddle Creek 2,585 ft., Flippen 2,016 ft., Swastika 3,010 ft.

Taylor County: Tom B. Medders 1 J. S. Pinckley, Lot 9, League 124, Grimes CSL, 3½ mi. NE Merkel, dry, TD 2,775 ft., coal 2,426-30 ft., Gunsight 2,765 ft.

Young County: Goodstein & Gordan 1 Perkins-Prothro, Blk. 24, Young CSL, 1 mi. NE Murray, dry, TD 2,620 ft.

SOUTHWEST TEXAS

Well Has Good Showing In Jim Hogg County

CORPUS CHRISTI.—Standard Oil Co. of Texas 1 Lucinda Green et al, discovery well 3 miles west of Gause and 8 miles northeast of Milano in Milam County, pumped at the rate of approximately 2 bbl. oil per hour for 2 hours. Production is through perforations at 5,697-5,704 ft. in the top of Edwards lime.

In Jim Hogg County, approximately 2 miles south of Armstrong field, King & Daubert 2 E. L. Armstrong swabbed in and looks like a good oil well. Total depth is 3,215 ft. with 7-in. casing set to 3,215 ft., and perforations at 3,210-14½ ft. for completion. Well is now shut in for storage with 100 psi. shut-in pressure on the tubing and 500 psi. on the casing. Gravity of the oil is 27°.

H. R. Smith, W. C. McBride, Inc., and Progress Petroleum, Inc., 1 Paula V. de Garcia, approximately ⅔ mile east of Magnolia City field, in Jim Wells County, has set casing for completion attempt, with total depth at 6,220 ft. On drill-stem test at 5,638-42 ft., through ¼-in. chokes, developed 270 psi. working pressure in 8 minutes and recovered 8 ft. of condensate-cut mud, with bottom-hole pressure of 1,120 psi. open and 2,420 psi. closed. This well is located in R. J. Kleberg Survey 102, 7 miles south-southeast of Alice.

Humble Oil & Refining Co. 1 Santa Fe Ranch, wildcat in southeastern Brooks County, recovered 279 ft. of 32.5°-gravity oil on drill-stem test at 3,231-39 ft. Operators are drilling ahead below 3,339 ft. in shale. Contract depth is 9,200 ft. This well is in San Salvador del Tule Grant, 6½ miles southeast of Encino.

There were 46 new locations reported for Districts 1 and 4, of which 13 were wildcat starts, 2 each in Duval, Starr, and Williamson, and 1 each in Atascosa, Bexar, Edwards, Jim Hogg, Kenedy, Milam, and Webb counties. Four successful wildcats were completed, 1 each in Aransas, Hidalgo, Nueces, and San Patricio counties, and 10 wildcat failures were completed, 2 in Bastrop and 1 each in Atascosa, Duval, Jim Wells, Kenedy, Kleberg, Medina, Travis and Webb counties.

SOUTHWEST TEXAS (DISTRICTS 1 & 4) SUCCESSFUL WILDCATS

Aransas County: New oil pool—Sullivan & Garnett 1 Geo. E. Shelly et al, (near Lamar), in Tract 2 out of Reserve "D" Survey, ½ mi. E of Lamar townsite, on south end of Lamar Peninsula, top pay 7,286 ft., TD 7,625 ft., perf. 7,286-96 ft., IP: 30 bbl. oil per day through a 9/64-in. choke, GOR 10,666, TP 1,025 psi., casing sealed, gravity 38°.

Hidalgo County: New oil pool—Sun Oil Co. 1 Bentsen Bros., Sec. 3, G. O. Newman Subd. in El Benadito Grant, 4 mi. S of La Reforma field and 7 mi. S of La Reforma townsite, top pay 5,940 ft., TD 9,120 ft., perf. 5,967-69 ft., IP: 44 bbl. oil per day through an 11/64-in. choke, GOR 10,361, TP 920 psi., CP 1,140 psi., gravity 47°, no water.

Nueces County: New oil pays Farenthold field—Southern Minerals Corp. D-4 Richard King Farm Lots, dual completion: top pay 5,750 ft., TD 6,141 ft., perf. 5,760-66 ft., IP: 62 bbl. oil per day through ⅛-in. choke, GOR 3,987 ft., CP 1,475 psi., gravity 48.4°, no water. Top pay 6,107 ft., perf. 6,123-31 ft., IP: 150 bbl. oil per day through ⅛-in. choke, GOR 1,703, TP 1,450 psi., gravity 43.8°, no water.

San Patricio County: New oil pay East White Point—Stanolind O. & G. Co. 2 J. A. Teeter, Sec. 50, Geo. H. Paul's Subd. of CPF Co. Lands, TD 6,803 ft., perf. 3,337-40 ft., IP: 103 bbl. oil per day through 10/64-in. choke, GOR 2,660, TP 1,000 psi., CP 1,275 psi., gravity 20.8°, no water.

SOUTHWEST TEXAS (DISTRICTS 1 & 4) WILDCAT FAILURES

Atascosa County: H. R. Smith & W. C. McBride, Inc., & Alaska Steamship Co. 1 E. Jendrusch, in A. Houston Sur. 197, 6 mi. NW of Fashing, & 2½ mi. NW of Weigang field, dry, TD 3,356 ft.

Bastrop County: Sanders Oil Co. 1 Elbert Bradshaw, in T. J. Gazley Sur., A-33, 2 mi. S of Smithville, dry, TD 1,602 ft.

Wildcats, Inc., 1 A. B. Harris, Est., in John Maxmillan Sur., 3 mi. SW of Red Rock, dry, TD 3,000 ft.

Duval County: Holly Development Co. & Barbara Oil Co. 1 Driscoll Est., in Blk. 68, Santa Rosalia Grant, 14 mi. W of Benavides, 2½ mi. SE of Ranchot Solo field, dry, TD 3,415 ft.

Jim Wells County: Comanche Corp. 1 B. A. Riedesel, in C. T. Schwab Subd., J. Poitevent Sur., A-359, 1¼ mi. W-SW of Wade City field, dry, TD 4,667 ft.

Kenedy County: Humble B-7 G. Kenedy, Jr. (Relief hole), Blk. 12, Kenedy Pasture Co., 1st addn. to Sarita Township, in El Paistle Grant, 3½ mi. NE of Sarita, dry, TD 948 ft.

Kleberg County: Humble PB-2 King Ranch-Morgan, in R. J. Kleberg Sur. 356, in Santa Gertrudis Grant, 7¾ mi. NW of Kingsville, 3 mi. W of Stratton field, dry, TD 8,405 ft.

Medina County: Sid Katz 1 A. Crow, in J. Tag Sur. 212, 3½ mi. S of Hondo, dry, TD 1,193 ft.

Travis County: H. F. Burkhardt 1 Charles Wolf, in L. Kimbro Sur., dry, TD 1,355 ft.

Webb County: O. W. Killam 70 Bruni Est., Sec. 7, J. R. Foltz Subd. of M. Arispe Grant, 2 mi. E of Bruni, dry, TD 4,065 ft.

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APPALACHIAN FIELD

Peoples Natural Gas Co. To Make Oriskany Test

PITTSBURGH.—In Unity Township, Westmoreland County, Pennsylvania, Peoples Natural Gas Co. has made a location for an Oriskany test on the William Piper farm. It is located on the Chestnut Ridge anticline at an elevation of 2,061 ft., Donegal Quadrangle, 6,500 ft. west of longitude 79 degrees 20 minutes and 3,700 ft. south of latitude 40 degrees 15 minutes.

New locations for the week reported in Pennsylvania were three, two, in Kittanning Township, Armstrong County, and one in Conemaugh Township, Indiana County.

In Big Creek district, Raleigh County, West Virginia, United Fuel Gas Co., in its test on the New River Pocahontas Coal Co. No. 1-6219 has reached a depth of 5,015 ft. In Steele district, Wood County, Columbian Carbon Co., in No. 1-1069 Leslie Thompson well is floating in the 7-in. casing. The depth of the hole is 4,702 ft. In this wildcat area, but in Grant district, Jackson County, United Carbon Co., in Nathaniel Waterbury No. 2 topped the Oriskany sand at 4,995 ft. with a show of gas at 5,000 ft.

In Sheridan district, Calhoun County, Godfrey L. Cabot, Inc., is drilling at a depth of 4,935 ft. in No. 1-880 Mary V. Bunner.

In Oceana district, Wyoming County, United Producing Co. reported No. 13-1487 Pardee Land Co., 1,750,000 cu. ft. gas, after shot in the Berea sand, total depth 3,451 ft.

New locations in West Virginia totaled 10, in Birch district, Braxton County; 1 in Sherman district, Calhoun County; 1 in Center district, Gilmer County; 1 in Ripley and 2 in Ravenswood and 1 in Union district, Jackson County; and 1 each in Cabin Creek Elk, and Poca districts, Kanawha County.

SOUTH LOUISIANA

Texaco Completes Deepest Producer in the State

NEW ORLEANS.—The deepest producer in Louisiana and one of the deepest in the world has been completed by The Texas Co. 111 Leeville-L. L. & E. in Leeville field, Lafourche Parish. It was completed through perforations at 14,074-14,087 ft. for a potential of 303 bbl. daily through a 5/32-in. choke. Tubing pressure 1,900 psi., oil and gas ratio 909, gravity 29.5°. Total depth is 14,473 ft. Previously, the record was held by Shell Oil Co., Inc., B-2 Smith-State, at Week's Island, Iberia Parish, which was completed from 14,015-14,040 ft.

In the Gulf of Mexico, 9 miles offshore from Jefferson Parish, Humble Oil & Refining Co. A-1 State, Lease 801, topped oil sand at 8,500 ft. and drilled to 8,730 ft. Casing will be set at 8,750 ft. in directional hole for completion attempt. In the first hole salt water was encountered at 7,806 ft. and hole drilled to 8,600 ft. Tests in salt fractures failed to show and hole was sidetracked around 3,700 ft. and drilled to the southwest.

The California Co. 1 State Lease 1278, a North Pass wildcat in the Gulf of Mexico, offshore from Plaquemines Parish, 6 miles east of Delta Duck field production, and also 15 miles southeast of Barnsdall et al Breton Sound gas discovery, is reported having oil shows on log runs to around 6,000 ft. Operators are drilling below 8,500 ft. on the projected 12,500-ft. test.

A new shallow pay zone in West Cote Blanche Bay field of St. Mary Parish has been opened by The Texas Co. 37 State-West Cote Blanche Bay, Lease 340. Drilled to a total depth of 3,153 ft., the well flowed 32 bbl. of 20.7°-gravity oil per day through an 11/64-in. choke, with flowing pressure on tubing 750 psi. Gas-oil ratio 750. Production is through perforations at 2,364-2,370 ft.

There were 7 new locations reported this week, 3 being wildcat starts, 2 in Lafourche Parish and 1 in Iberville Parish. Three exploratory tests were successful opening the North Gordon condensate pool in Beauregard pool in Beauregard Parish, 2 new oil sands, 1 each in West Cote Blanche Bay, St. Mary Parish and Block 32 off shore of Terrebonne Parish. One wildcat was dry in Calcasieu Parish.

SOUTH LOUISIANA SUCCESSFUL WILDCATS

Beauregard Parish: North Gordon discovery—Barnsdall Oil Co. 2 Edgewood, 14-6s-10w, 2 mi. SW of Longville production, top sand 8,458 ft., TD 9,300 ft., perf. 8,458-63 ft., IP: 141 bbl. condensate per day through a 10/64-in. choke, GCR 10,646, TP 2,575 psi., gravity 58.1°, no water.

St. Mary Parish: New oil sand West Cote Blanche Bay—The Texas Co. 37 State-West Cote Blanche Bay Lse. 340, in Twp. 15s-6e, TD 3,153 ft., top sand 2,364 ft., perf. 2,364-70 ft., IP: 32 bbl. oil per day through 11/64-in. choke, GOR 750, TP 750 psi., gravity 20.7°, 46 per cent water.

Terrebonne Parish: New oil sand Block 32—Kerr-McGee Oil Industries, Inc., 2-32 State-Ship-Shoal area, TD 3,238 ft., top sand 2,808 ft., perf. 2,808-24 ft., IP: 700 bbl. oil per day through 21/64-in. choke, GOR 86, TP 200 psi., gravity 27.7°, 0.1 per cent water.

SOUTH LOUISIANA WILDCAT FAILURE

Calcasieu Parish: Stanolind O. & G. Co. 2 D. C. Powell, Moss Lake area, 9-11s-9w, dry, TD 10,502 ft.

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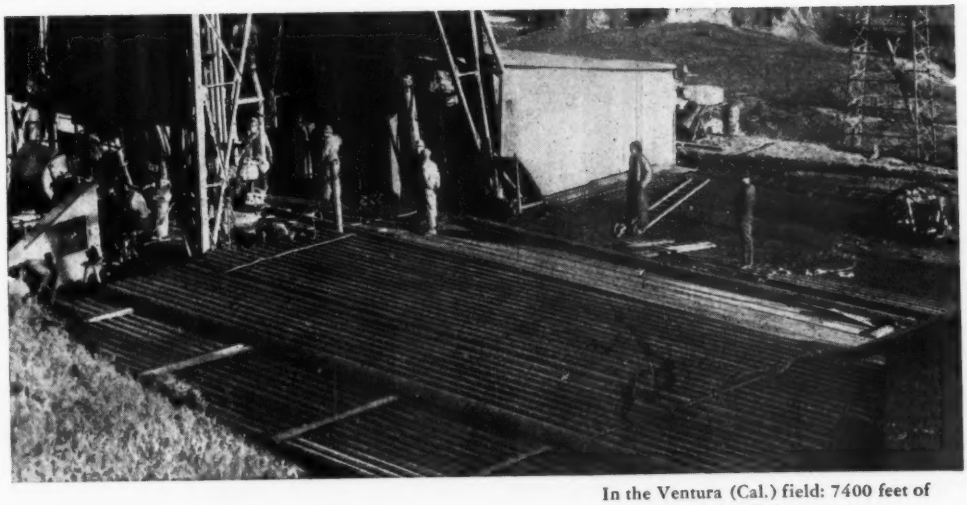

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TEXAS GULF COAST

New Gas Condensate Field Opened in Wharton

HOUSTON.—A new gas-condensate field has been opened in Wharton County 3 miles southeast of El Campo. The Lloyd Smith & McKay Donkin 1 Joe Mach, Section 25, ETRR Survey, 1½ miles west of the Twin Basin gas production, gaged 3,245,000 cu. ft. of wet gas daily through ¼-in. choke, through perforations at 6,775-6,834 ft. in Frio formation. Open flow production was estimated at 67,000,000 cu. ft. daily. Total depth is 7,132 ft. with 5½-in. casing at 6,834 ft.

A new townsite oil field for Wharton County has been reported at Louise, ½ mile northwest of townsite proper. Sam G. Harrison, Jr., 1 Stockton is reported to have recovered 1,000 ft. of oil on drill-stem test around 4,100 ft. Total depth of hole is 5,920 ft. Gas shows were also reported at 5,100 ft. and 5,500 ft. The test is in the IRR Co. Survey, Section 7.

A new producing horizon for Winnie field of Jefferson County has been opened at Al Brown et al 1 Edwin L. Stephen, located in Francisco Valmore League, Abstract 54, which gaged 1,795,000 cu. ft. gas per day through a 12/64-in. choke with flowing pressure on tubing at 2,220 psi. Open-flow calculation was 25,000,000 cu. ft. of gas per day. Total depth is 7,816 ft., and production is through perforations at 5,462-68 ft. in the Miocene sands.

A new sand for West Columbia field, Brazoria County, has been opened by The Texas Co. 32 J. G. Phillips et al, located in George Tennille League, Abstract 31. Drilled to a total depth of 7,331 ft., pipe was perforated from 6,676-6,706 ft. and completed flowing 162 bbl. of 28°-gravity oil per day through a ¼-in. choke. Flowing pressure on tubing ranged from 60 to 300 psi. during the test. Gas-oil ratio was 317, showing 0.2 per cent water. Top of sand at 6,676 ft.

The 44 new locations reported for Districts 2 and 3 included 15 wildcat starts, 4 in Brazoria, 2 each in Wharton and Refugio, and 1 each in Bee, Calhoun, Chambers, Harris, Jackson, Matagorda and Montgomery counties. Four successful wildcats were completed, 1 each in Brazoria, Harris, Jefferson and Wharton counties, while 6 were dry, 1 each in Calhoun, Fort Band, Liberty, San Jacinto, Victoria and Wharton counties.

TEXAS GULF COAST (DISTRICTS 2 & 3) SUCCESSFUL WILDCATS

Brazoria County: New oil sand West Columbia field—The Texas Co. 32 J. G. Phillips et al, in Geo. Tennille Lge., A-31, TD 7,331 ft., top sand 6,676 ft., perf. 6,676-6,706 ft., IP: 162 bbl. oil per day through a ¼-in. choke, GOR 317, TP 60-300 psi., gravity 28°, 0.2 per cent water.

Harris County: New oil sand Hockley dome —Magnolia Pet. Co. 7 Warren Ranch, HT&B 1, A-411, TD 3,725 ft., top sand 3,046 ft., perf. 3,063-66 ft., IP: 168 bbl. oil per day through a 12/64-in. choke, GOR 182, TP 360 psi., 25.6° gravity, no water.

Jefferson County: New gas sand Winnie—Al Brown et al 1 Edwin L. Stephen, Lot 84 Francisco Valmore Lge., A-54, TD 7,816 ft., sand 5,460 ft., in Miocene sands, perf. 5,462-68 ft., IP: 1,795,000 cu. ft. gas per day through a 12/64-in. choke, open flow calculation 25,000,000 cu. ft. gas per day, TP 2,220 psi., CP 2,240 psi., dry gas, no water.

Wharton County: New gas pool — Lloyd Smith & McKay Donkin 1 Joe Mach, ETRR Sur. Sec. 25, A-150, 3 mi. SE of El Campo townsite, TD 7,132 ft., top sand 6,775 ft., perf. 6,775-6,834 ft., IP: 3,245,000 cu. ft. gas per day through a ¼-in. choke, open flow 67,000,000 cu. ft. gas per day, TP 2,264 psi., shut-in pressure 2,684 psi., no water in the flow.

TEXAS GULF COAST (DISTRICTS 2 & 3) WILDCAT FAILURES

Calhoun County: Quintana Petr. Corp. 1 Joe A. & A. F. Martin, in F. Garcia Sur. A-15, dry, TD 11,300 ft.

Fort Bend County: The Sparta Oil Co. et al 1 R. L. Furnace, Arcola area, in Manuel Escalera Sur., A-170, 2 mi. NW of Iowa Colony & 1 mi. E of Arcola junction, dry, TD 7,008 ft.

Liberty County: Claud B. Hamill & Wm. A. Smith 1 Grayburg Land & Timber Co. in Edward Tanner Lge., A-353, 7 mi. N of Hardin, dry, TD 7,915 ft.

San Jacinto County: J. K. Dorrance 1 J. E. Duff et al, in Solomon Cole, A-83 & U. Gibson Surs. A-133, NW of Sulphur production, dry, TD 5,510 ft.

Victoria County: P. R. Rutherford 1 J. V. Lala, in John Hays Sur., 2½ mi. E-SE of DaCosta and 2½ mi. N of Placedo, dry, TD 5,103 ft.

Wharton County: J. B. Ferguson et al 1 Brooks, Lane City townsite area, in D. D. D. Baker Sur., A-71, 1 mi. SW of Sohio's Lane City townsite No. 1 discovery oiler, dry, TD 6,750 ft.

EASTERN TEXAS

Cherokee County Well Preparing for Test

DALLAS.—Hopkins County's prospective Paluxy discovery, Shell Oil Co., Inc., 1 Hedrick estate, in the G. B. Halyard Survey, 5½ miles southeast of Sulphur Bluff, was moving heavy pumps back to the location to circulate oil and clean the hole of heavy oil and mud. Total depth is 4,800 ft., plugged back to 4,555 ft. and perforated at 4,500-06 and 4,525-50 ft. Tubing was run and in a day's swabbing the heavy fluid was lowered to 1,900 ft. off bottom, recovering very heavy mud slightly cut with heavy black sticky oil. It was shut in overnight and fluid rose to within 500 ft. of the top. It became necessary to install the pumps when the swab recovered only a small amount of the heavy fluid on each trip.

Nine miles west and slightly south of Alto, in Cherokee County, Geier-Jackson, Inc., 1 Southern Pine, N. Jones Survey, was preparing to run tubing to test after recovering oil on a drill-stem test of the Woodbine sand. The first test, at 5,233-55 ft., open 1 hour, recovered 15 ft. of mud. At total depth of 5,450 ft., 5½-in. casing was set on bottom and perforated between 5,313-15 ft. When the tool was opened gas came to the surface in 2 minutes, followed

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by oil in 14 minutes, on a flowing surface pressure of 200 psi. It was allowed to flow for 16 minutes but no estimate was made on the recovery. After the tool was closed, the well headed at intervals. Recovery in the pipe was 450 ft. of clean oil, plus 20 ft. of mud. Nearest production is the William Wise area about 4 miles north.

Nine miles east of Rusk, Cherokee County, R. J. Caraway 1 Sessions, J. M. Musquez Survey, was said to be flowing an unestimated amount of gas and distillate from perforations around 4,204 ft. Previous perforations at 4,290-91 ft. were squeezed. On 12/64-in. choke, tubing pressure was 1,100 psi. Operators were to skid the rig east to drill the 2 Sessions, in the same survey.

In Angelina County, Union Producing Co. 2 Bolton, Edwards lime test 7 miles northeast of Lufkin, recovered 180 ft. of gas-cut mud plus 120 ft. of salt water on a 35-minute drill-stem test from 6,275-6,305 ft. The limestone section was not identified. The well has had no shows on tests higher in the hole.

Newton Oil Co. 1 Mrs. DeArmon, Henderson County wildcat, squeezed perforations in the upper Rodessa at 7,663-86 ft. after swabbing salt water with a slight show of oil and gas.

New exploratory work in East Texas included Star Oil Co., Dallas, 1 Gamble & Lancaster, a 4,500-ft. Woodbine sand test 7 miles south of Malakoff in Henderson County. Standard Oil Co. of Texas was building roads for its 1 T. E. Acker, T. R. Walker Survey, 2½ miles northwest of Maydell and 1¼ miles southeast of its recent Rodessa gas-distillate discovery. Contract depth is 9,000 ft.

ROCKY MOUNTAIN

Powder River Basin Tests Prove Disappointing

DENVER.—Events of the past week have been discouraging for development of the east side of the Powder River basin. Bay Petroleum Corp.'s first well in the Lodgepole area, 15 miles west of Mush Creek pool, swabbed oil and water on test this week. A week ago the well made 14 bbl. of oil per hour, swabbing with fluid level at approximately 2,400 ft. from the surface. The operator pulled the tubing and moved in heavier equipment, and through casing the well swabbed at the rate of 60 bbl. of oil and 110 bbl. of water. The Dakota in this well was found at 6,711 ft. with total depth at 6,737 ft., corrected. Saturation was logged between 6,730-37 ft. and the water is believed to be coming from the base of the sand. Bay's second test, the Goodson-Smith, C NE SE 14-44n-66w, 2½ miles southeast of the discovery, topped the Dakota at 6,552 ft. and is now drilling below 6,661 ft. in the Lakota sand. The well is reported 200 ft. higher structurally than the first well, but encountered no saturation in the Dakota or Lakota sands. Four and a half miles east of the first Bay well the Monoco Oil Co. 1 Long, CWL SE NE 18-44n-65w, is shut down after failing to find production in the Dakota and Lakota formations. Dakota was topped at 6,260 ft., Fuson at 6,290 ft., and Lakota at 6,335 ft. On drill-stem test at 6,216-6,414 ft., the well made 5,436 ft. of mud and water, with a slight trace of oil and gas, in 1 hour. The well is now at 6,418 ft., total depth, and may be drilled to the Sundance before completion.

In the northeastern section of the Powder River basin, exploration drilling in two areas in an attempt to establish production in stratigraphic trap areas has failed. In the Moorcroft area The Texas Co.'s second well at the 2 Robinson, NW SW SE 8-49n-67w, Crook County, is an apparent failure after it was unsuccessful in finding production in the Newcastle and Dakota sands. The well was drilled to 5,353 ft., total depth, and found the two sands dry. In the Rocky Point area, 40 miles north of Moorcraft, R. R. Murray et al 1 Otis Roberts, NE SE NW 4-56n-68w, has been plugged after finding the Newcastle thin and hard. The Superior-Hunt-Phillips wildcat in NW SE SW 13-56n-69w, also found the Newcastle hard and tight, with no shows, and this well is now drilling for the Dakota before completion.

Tensleep has been found by Ohio Oil Co. and Stanolind Oil & Gas Co. in their Enos Creek discovery, and on drill-stem test between 6,428-75 ft. the well made 1,140 ft. of clean oil and 90 ft. of drilling mud in 1 hour. Top of the Tensleep is at 6,373 ft. and the well is now reported below 6,500 ft., still in that formation. The well is the 1 L. U. Sheep, SE SW NW 25-46n-100w, the first below the Sundance in Enos Creek field. Three weeks ago the well made oil on drill-stem tests in the Phosphoria between 6,150-6,339 ft., and apparently will be a commercial discovery in that formation. The operator will probably test the Madison before completion of the test.

Granite was found at 4,485 ft. in the Stanolind-Frontier Refining Co. wildcat at Bar-X, just across the Colorado line in Grand County, Utah. The well was drilled to 4,493 ft., total depth, and is now shut down waiting on orders. The operators may plug the well back as a gas producer in the Morrison formation, which showed approximately 8,000,000 cu. ft. of gas on drill-stem tests, or it may be plugged. The gas is reportedly low on B.t.u.'s and the closest market is the town of Grand Junction, Colo. The well is the 1 Crittenden, C SE SE 12-17s-25e. It is of interest that the well went from Chinle (Triassic) beds

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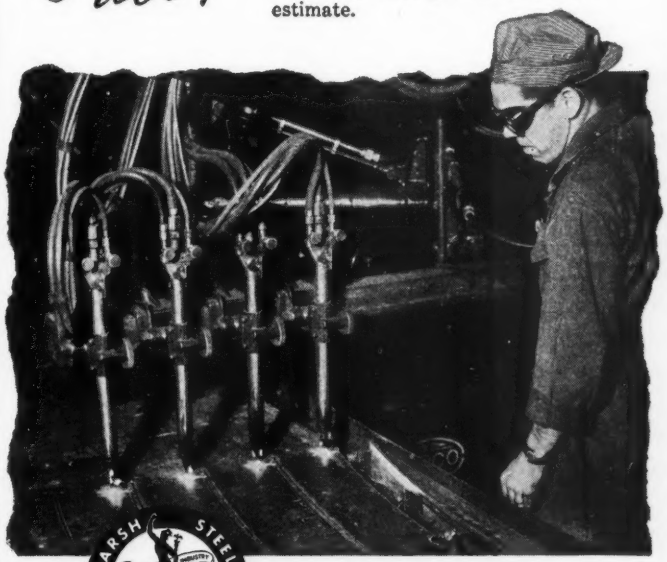

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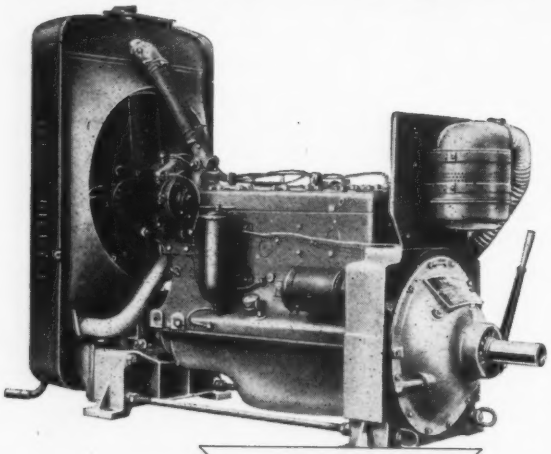

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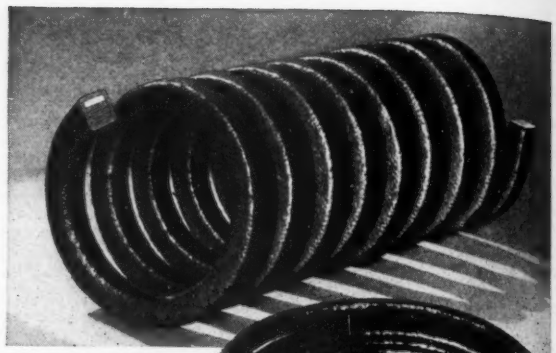

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into granite wash and then into granite, without finding the Weber sand (Pennsylvanian) expected in the area.

WYOMING SUCCESSFUL WILDCATS

Big Horn County, Sage Creek: Sohio and Barnsdall 1 Fox, C SE SW 6-57n-97w,

(Continued on page 154)

OHIO, KENTUCKY

Knox County Well Finds Good Clinton Pay

COLUMBUS.—The Preston Oil 3 R. E. Melick, Section 7, Jackson Township, Knox County, found the Clinton at 2,888-2,939 with good showing of oil throughout the pay. After shot, the well made 160 bbl. of oil in 30 hours and 115 bbl. in the next 24 hours. In Section 24 of the same township, the Mid East Oil 1 C. M. Darling, gaged 225,000 cu. ft. of gas natural at 2,935-56 ft. After a 150-qt. shot, the gage was 2,800,000 cu. ft. of gas in 1 hour with a mist of oil.

The Clinton Oil 4 W. A. Mauk, Section 28, Madison Township, Perry County, made 30 bbl. of oil and 265,000 cu. ft. of gas natural, and in the first 24 hours after a 90-qt. shot, flowed 105 bbl. Clinton sand was logged at 3,189-3,234 ft.

The second Newburg oil well in Jackson Township, Ashland County, was drilled in at the Hayes Leslie, Section 18. The sand, which came in at 2,579-92 ft. with an estimated 40 bbl. of oil natural, will be acidized.

The new Lower Penfield gas pool was extended a location to the west by the Ohio Fuel 2 D. J. Evans, Lot 23, Penfield Township, Lorain County. Clinton sand at 2,444-56 ft. gaged 1,780,000 cu. ft. of gas natural.

OHIO SUCCESSFUL WILDCATS

Morgan County, Bristol Township: Wittmer Co. 1 Wm. O. Wortman, Sec. 24, Shell 4,807-20 ft., Clinton 4,840-47 ft., 1,039,000 cu. ft. of gas, TD 4,900 ft.

OHIO WILDCAT FAILURES

Lawrence County, Lawrence Township: Ewing & Collins 1 J. F. Huddle, Sec. 6, Clinton 3,006-18 ft., TD 3,018 ft.

Wayne County, Wayne Township: Ackerman Dev. Co. 1 Swinehart, Sec. 34, Clinton 3,389-3,405 ft., TD 3,438 ft.

WESTERN KENTUCKY

OWENSBORO.—A new pool was assured for Webster County when the Shelton-Ashland et al 1 Ramsey, SE NE SW 21-M-22, pumped 75 bbl. of oil with no water on further tests of the O'Hara at 3,040-47 ft., total depth.

Also in Webster County, Pure-Ashland et al 1 Walker, 22-N-24, is currently drilling at 2,014 ft., about 600 ft. below the deepest of the three producing horizons in the Sebree field 1¼ miles to the northwest.

The Guffie area of McLean County got two large producers this week. Miller-Shiarella-Ashland 3 Wright, 16-N-28, pumped 100 bbl. of oil per day from the Jackson sand at 1,891-1,900 ft., and the same operators' 3 Leachman, 13-N-27, was good for 200 bbl. of oil per day from the Cypress zone at 1,961-93 ft.

EASTERN KENTUCKY

ASHLAND.—Three miles north and slightly west of Furnace gas field and located in 12-P-68, J. C. Kindred had top of Knox dolomite at 2,160 ft. on C. C. Abner tract and was drilling at 2,730 ft. with hole full of sulfur water. Casing will be run in an attempt to shut off water before attempting to drill ahead.

Roy Davis et al 1 George Reddix, a wildcat in 4-Q-68 on the Montgomery-Powell County line, is shut down at 2,490 ft. in Knox dolomite topped at 2,000 ft. with only light shows of gas reported.

A rank wildcat Knox dolomite test has been staked in 21-R-72, Menifee County. It will be known as Willett Groover et al 1 Motley. Test is in same area where an old well had promising shows of gas in the lower formations.

EASTERN KENTUCKY WILDCAT FAILURE

Morgan County: Jim Patton 1 Chris Lykins, 2-P-76, dry, TD 1,722 ft., Big lime 514 ft., Berea sand 1,076 ft., Corniferous lime 1,506 ft., slight shows of oil and gas.

INDIANA

OWENSBORO.—One of the best wells to date in the Owensville area is indicated at the McBride, Inc. 1 Tichenor, NW SW NW 13-3s-12w, Gibson County, which swabbed more than 450 bbl. of oil in 21 hours, and is preparing to test the Waltersburg at 1,806-15 ft., total depth. The well has not been shot.

Cokes et al 1 Boeke, SE NE NE 6-6s-11w, has installed equipment and continues to test the Aux Vases formation where a flow of clean oil was encountered last week. The well was perforated at 2,562-69 ft. and acidized with 1,000 gal. It swabbed 20 bbl. of oil, natural, in the first hour, later declining to 15 bbl.

Other wildcats include: McBride 1 Johnson, NE NE SE 18-3s-11w, drilling at 2,450 ft., and Skiles 1 Colvin, NE NE SW 27-1s-11w, drilling at 1,870 ft. below the Barlow lime, both in Gibson County. Coy Oil Co. 1 Bray-Cox, NW NE SW 5-8s-14w, Posey County, is drilling ahead at 2,599 ft. In Vanderburgh County, Gilliam Drilling Co. 1 Spilker, SE SW NW 12-5s-11w, recovered gas in ½ hours, 600 ft. of oil and 180 ft. of oil-cut mud on a drill-stem test at 2,455-68 ft. The well is currently waiting on cement, with 5½-in. casing bottomed at 2,535 ft.

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INDIANA SUCCESSFUL WILDCAT

Posey County: Discovery well, Ford North pool. G. L. Reasor 1 Justus, NE NE NE 15-6s-15w, 100 bbl. oil from Cypress sand at 2,242-56 ft., after 40-qt. shot, TD 2,256 ft.

INDIANA WILDCAT FAILURE

Miami County: Ross Phar 1 Catey, SE NW NW 12-27n-4e, dry, TD 1,062 ft., Trenton 1,043 ft.

PERMIAN BASIN

Casing Set at 9,400 Ft. On Terry County Well

MIDLAND. — Northeast Terry County's Pennsylvanian discovery, 10 miles northeast of Brownfield, was to complete from open hole between 9,400-55 ft. The well, Seaboard Oil Co. of Delaware 1 E. M. Hinson, 660 ft. from north and west lines of Section 91, Block 4-X, PSL Survey, recovered an estimated 80 bbl. of oil in 90 minutes on its first drill-stem test from 9,402-28 ft., and 91 bbl. of oil on a 2-hour test from 9,401-39 ft. The last reported test, from 9,439-55 ft., brought gas to the surface in 6 minutes, producing a steady blow of gas for 90 minutes, then gas by heads for the remaining half hour the tool was open. Operators believed the well would have flowed oil if the tool had been open longer. Recovery was 8,200 ft. of clean oil and 450 ft. of heavily oil and gas-cut mud, with no water.

The pay zone has been tentatively identified as the Cisco limestone. Top of the Pennsylvanian was 9,405 ft., drilled to total depth of 9,405 ft. Seven-inch casing is set to 9,400 ft. On one of the drill-stem tests, the oil tested 41.3° gravity. On the last test, open flowing bottom-hole pressure was 1,300 psi. at the end of the 2-hour period, increasing to 2,000 psi. after shut in 15 minutes. Operators ran electrical survey following the third test. Nearest production, about 20 miles to Slaughter and the same distance to Adair, is from the San Andres, middle Permian.

Upton County operations around Benedum field so far have found no encouraging signs of oil. D. D. Feldman 1 Pray-State, 3 miles northwest of the Alford well, has plugged back to 7,575 ft. to test the Clear Fork section, which, according to some reports, had oil shows while drilling. The well was said to have shown oil on the pits while drilling from 7,505-40 ft. Two miles east of the Pray-State, Republic Natural Gas Co. 1-E-A Rosa Halff Barnett recovered 250 ft. of oil on a drill-stem test from 7,460-7,545 ft. Last report on Republic's well had it drilling below 11,017 ft., and looking for top of the Silurian around 11,100 ft. It had top of the Devonian at 10,545 ft.

Slick-Urschel Oil Co. and Shell Oil Co., Inc., 1 A. E. Gordon, northwest stepout to the 1 Alford, was drilling below 11,283 ft. in dolomite, tentatively identified as the Ellenburger. Top of the formation was picked from samples as 11,240 ft., on an elevation of 2,689 ft. Operators were to run electrical log to check the identity of the formation. At 11,283 ft., it had no shows of oil.

Slick-Urschel 1 Mary Standifer, southwest offset to the 1 Alford, had not tested the first 500 ft. of Ellenburger, and some field reports said such a test would not be made until the well has reached the zone which yielded some water above the pay in the discovery well. The 1 Standifer ran a 3-hour drill-stem test from 11,811-11,901 ft., recovering 1,080 ft. of water blanket, 180 ft. of gas-cut mud and 780 ft. of salt water.

Slick-Urschel 1 Gordon, northwest offset to 1 Alford, was drilling ahead in Simpson shale below 11,113 ft. Plymouth Oil Co. 1 Taylor-Sadler, southeast offset, was drilling at 10,627 ft. in lime and chert. Plymouth and Slick-Urschel 1 Wallace, northeast of the discovery, was drilling below 10,418 ft.

Three miles north of Benedum field, Humble Oil & Refining Co. 1-A Barnett was drilling below 11,931 ft. in dolomite after running two 75-minute drill-stem tests. The first, from 11,780-11,851 ft., recovered 2,034 ft. of water blanket and 425 ft. of drilling mud. The second, from 11,851-91 ft., recovered 2,000 ft. of water blanket and 180 ft. of watery, gas-cut drilling mud. Top on the Ellenburger was 11,650 ft., on an elevation of 2,692 ft., or some 607 ft. lower than the 1 Alford. Humble's 1-B Barnett was drilling at 7,512 ft. in the Permian section.

West Texas counties gained 67 new locations last week, including 7 wildcats. Crockett County gained 2 wildcat tests.

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while Ector, Howard, Mitchell, Runnels and Sterling counties received 1 each. Counties and the number of new development locations were: Andrews 14, Cochran and Hockley 6 each, Ector and Reeves 5 each, Crane and Garza 4 each, Gaines 3; Coke, Crockett, Howard and Scurry 2 each, and 1 each for Glasscock, Schleicher, Ward, Winkler and Yoakum

WEST TEXAS (DISTRICTS 8 & 7-C) SUCCESSFUL WILDCATS

Cochran County: C. U. Ray 1 Ralph Gardner, Unit 15, League 131, Carson CSL, 5 mi. SE Lehman, pumped 88 bbl. 30°-gravity oil a day, with some water, San Andres 4,970-5,010 ft., TD, elev. 3,838 ft.

Gaines County: Cities Service Oil Co. and Atlantic Refining Co. 1 Proctor, Sec. 355, Blk. G, CCSD&RGNG Sur., 10 mi. NW Seminole, flowed 411 bbl. 34.4°-gravity oil a day, 30/64-in. choke, GOR 8,420 cu. ft., San Andres 5,042-5,203 ft., TD 5,352 ft., tubing pressure 850 psi., casing 1,225 psi., elev. 3,462 ft.

Hockley County: Geo. P. Livermore, Inc., 1 Devitt estate, Labor 6, League 29, Rusk CSL, 2 mi. S Levelland, pumped 128 bbl. 31°-gravity oil a day, San Andres pay 4,856 ft., TD 4,957 ft., PB 4,845 ft., GOR 323 cu. ft., elev. 3,506 ft.

Scurry County: Sun Oil Co. and Humble Oil & Refining Co. 1 Emil Schattell, Sec. 186, Blk. 97, H&TC Sur., 7 mi. SW Snyder, flowed 480 bbl. 44°-gravity oil a day, natural, through ¼-in. choke, Canyon lime 6,816-91 ft., TD GOR 315 cu. ft., casing pressure 625 psi., tubing 600 psi., elev. 2,388 ft.

WEST TEXAS (DISTRICTS 8 & 7-C) WILDCAT FAILURES

Concho County: B. A. Duffy 1 Burk, Sec. 12, F. D. Wilson Sur., 3½ mi. N Eden, dry, TD 3,906 ft. in sand.

Gaines County: W. H. Black Drilling Co. 1 L. H. Wentz, Sec. 8, Blk. A-25, PSL Sur., 13 mi. SW Seminole, dry, TD 7,630 ft., no tops reported.

Howard County: J. A. Worsham 1 J. A.

(Continued on page 153)

CANADIAN FIELDS

Fourteen Completions Listed for Leduc Field

CHATHAM.—Fourteen completions with aggregate initial restricted production of 2,067 bbl. have been listed for Leduc field, representing largely wells whose completion was delayed as a result of the shutting down of the field in the early days of the Atlantic 3 wild well.

The completions are: Continental-Leduc 2, LSD 1, 9-50-26w4, at 5,420 ft., initial 125 bbl. Globe-Leduc 7, LSD 5, 19-50-26w4, 5,353 ft., 172 bbl.; Imperial 41, LSD 15, 16-50-26w4, 5,140 ft., 85 bbl.; Imperial 45, LSD 10, 9-50-26w4, 5,419 ft., 126 bbl.; Imperial 49, LSD 3, 28-50-26w4, 5,085 ft., 134 bbl.; Imperial 51, LSD 6, 28-50-26w4, 5,326 ft., 162 bbl.; Imperial 52, LSD 16, 20-50-26w4, 5,329 ft., 174 bbl.; Imperial 53, LSD 9, 20-50-26w4, 5,352 ft., 163 bbl.; Imperial 60, LSD 11, 20-50-26w4, 5,358 ft., 163 bbl.; Imperial 61, LSD 14, 27-50-26w4, 5,309 ft., 172 bbl.; Imperial 67, LSD 15, 9-50-26w4, 5,115 ft., 126 bbl.

Production of the Atlantic 3 wild well has dropped to 10,000 bbl. The directionally drilled south relief well is nearing completion, when an attempt will be made to bring the wild well under control.

Continental 8, LSD 11, 7-50-26w4, has established D-2 production to extend that field south and west. At 5,179 ft. gas flow was 403,000 cu. ft. with 1,450 ft. of oil.

Turner Valley.—In the Turner Valley north extension, Home Oil has three outpost wells to the north and west nearing completion. Home 33, LSD 11, 18-21-3w5, is finishing below 8,667 ft. after drilling the second porous zone of the Madison. Home 32, LSD 6, same section, has set casing and is drilling into the lime; and Home 31, LSD 2, got the lime around 8,554 ft.

Pincher Creek.—Testing has commenced at Gulf Canadian-Pincher Creek 1, LSD 15, 24-3-29w4, after deepening to 12,516 ft. First perforations were made in the Madison below 11,927 ft. after which load oil was swabbed clear and production tests started.

Armena.—A potential commercial producer from the D-1 zone is indicated in Imperial-Armena 1, LSD 13, 10-28-21w4, which discontinued drilling at 4,998 ft. No production was secured in the lower zones, but D-1 showed good gas and fair gravity crude, which is now being tested.

LA.-ARK.

Deep Test in Athens Field Recovers Gas-Distillate

SHREVEPORT.—M. A. Halsey et al 1 Bishop-Lewis Unit, 30-20n-6w, deep test in the Athens field of Claiborne Parish, was showing some gas and distillate in the Travis Peak, considerably above its projected depth of 10,000 ft. A drill-stem test between 6,930-90 ft., open 1 hour and 15 minutes, at which time the packer failed, recovered 15 stands of gas-cut mud. Tubing pressure was 33 psi. Drilled out to 7,026 ft., a test from 7,010-26 ft., open 13 minutes, gaged tubing pressure of 1,200 psi., and recovered 64 ft. of mud cut with gas and distillate. Flowing bottom-hole pressure was 1,900 psi., increasing to 2,900 psi. when shut in.

A 25-minute test from 7,115-39 ft. recovered 210 ft. of gas-cut mud, with a slight cut of distillate. Flowing bottom-hole pressure had increased to 2,130 psi., and 3,030 psi. shut in. A 16-minute test from 7,140-70 ft. recovered 180 ft. of gas-cut mud and a slight show of distillate. Flowing bottom-hole pressure was 2,300 psi. Operators were to make production tests. Total depth is 7,230 ft.

In Natchitoches Parish, Victor P. Grage 1 W. D. Ambrose, 10-5n-6w, prospective Wilcox discovery, 15 miles southwest of Colfax, had nearly exhausted the water on last report. From perforations at 5,788-91 ft., it flowed 54 bbl. of oil in 14 hours through 7/16-in. choke, on tubing pressure of 415 psi., and was showing only slight amounts of sediment and water. On 4/64-in. choke it flowed 23 bbl. of oil in 23 hours, and on 6/64-in. choke it flowed 36 bbl. of oil in 20 hours. Operators continued testing. Oil is 44.8° gravity and gas-oil ratio is around 315 cu. ft. The well had previously flowed as much as 90 per cent sediment and water.

The California Co. 2 Maxey, 32-18n-1e, Ouachita Parish, was coring below 9,421 ft. in the Cotton Valley with no shows, after coring sand with gas odor at 9,324-30 ft., 9,330-80 ft. and 9,380-9,420 ft. The last core recovered 5 ft. of shaly lime, 8 ft. of fairly porous sand with no shows, 2 ft. of medium porous sand with slight gas show, and 14 ft. of dense, gray quartz, with no shows.

Skelly Oil Co. 1 Nunley Unit, DeSoto Parish, completed as a gas well to extend the Logansport 2 miles north. It flowed an estimated 7,250,000 cu. ft. of gas a day, open flow, from perforations in the Rodessa at 4,132-52 ft. Rock pressure was 2,187 psi.

In Arkansas, McAlester Fuel Co. 1-A W. D. Black, 24-15s-21w, Columbia County, 4 miles west of the Stephens field, completed for 66 bbl. of oil and 9 bbl. of salt water a day, to open the College Hill field. Total depth was 6,541 ft., in the Smackover, with perforations at 6,532-35 ft. Gravity of the oil was 34.6°.

In Union County, Curtis A. Kinard 1 Scales, 3-18s-17w, completed for 432 bbl. of 39.3°-gravity oil a day from Smackover lime pay at 7,769-68 ft., to open the Cairo field. The flow was through 15/64-in. tubing choke, on tubing pressure of 1,020 psi., and gas-oil ratio of 600 cu. ft.

ILLINOIS

New Pool Possible NW of Flora Area

MATTOON.—Phillips Petroleum 1 Kurr, NW SE SE 4-3n-6e, Clay County wildcat, approximately 2 miles northwest of the Flora field and the same distance northeast of the North Kenner field, was preparing to acidize the McClosky lime at 3,010-21 ft., with 3,000 gal. The well swabbed 5 bbl. of oil plus 5 bbl. of water per day. Total depth is 3,022 ft.

W. C. McBride 4 H. Frieman, SE SE NW 29-3s-4w, Washington County, twin well to the recent new pay discovery in the McKinley field and third well to test the Silurian in that field, swabbed 1½ bbl. of oil per hour from that formation, with the pay interval topped at 2,205 ft.

The West Frankfort pool of Franklin County got a good producer at Sohio Petroleum Co.'s 6 Horn-Diamond, SE SW SW 24-7s-2e, completed for 165 bbl. of oil per day, after acidizing, from the O'Hara at 2,733-82 ft. Rotary tools are being rigged up at the company's 5 Horn-Diamond, SE NW 25-7s-2e.

ILLINOIS SUCCESSFUL WILDCAT

Wabash County: Badger Basin Oil Co. 1 Schmidt, NE NE SW 8-1n-14w, 25 bbl. oil after shot with 40 qt. at 2,810-28 ft. Benoist sand 2,813 ft., Bethel 2,823 ft., TD 3,085 ft., Benoist sand 2,813 ft., Bethel 2,823 ft., Renault 2,934 ft., Ste. Genevieve 3,001 ft.

ILLINOIS WILDCAT FAILURES

Clay County: Calvert & Willias and Ashland O & R Co., 1 Langton, N/2 NW SE 20-4n-8e, dry, TD 3,134 ft. Benoist 2,833 ft., Aux Vases sand 2,912 ft., Ste. Genevieve 2,981 ft., McClosky 3,025 ft.

J. L. Black 1 Sesengood, NW NE SW 24-4n-8e, dry, TD 3,032 ft., Paint Creek lime 2,802 ft., Renault 2,912 ft., Ste. Genevieve 2,978 ft., Fredonia 3,007 ft., McClosky dolomite 3,010 ft.

R. W. Paulter 1 Negley, SE SW NW 25-4n-8e, dry, TD 3,017 ft., Paint Creek lime 2,843 ft., Benoist 2,881 ft., Renault 2,951 ft., Ste. Genevieve 3,010 ft.

Hardin County: Minerva Oil Co. 1 U. S. Bureau Land Management, SE SW SW 17-11s-10e, dry, TD 1,265 ft. Sample log, Rosiclare 1,115 ft., St. Louis 1,258 ft.

Minerva Oil Co. 1 Lane, NW NW NW 20-11s-10e, dry, TD 1,102 ft. Sample log Renault 1,058 ft.

Lawrence County: Aurora et al 1 Tucker, SW NW SW 6-2n-12w, dry, TD 2,378 ft., Glen Dean 1,784 ft., Golconda 1,893 ft., Paint Creek 2,110 ft., Benoist sand 2,132 ft., McClosky 2,326 ft.

Madison County: Geo. Cassens 1 Albrecht, SE SE SE 24-6n-7w, dry, TD 612 ft.

Murphy and Goldschmidt 1 Enskat, SE SE NE 18-3n-8w, dry, TD 1,707 ft., Ste. Genevieve 386 ft., St. Louis 470 ft., Chattanooga 1,120 ft., Devonian 1,226 ft., Trenton 1,637 ft.

Saline County: Olson & Johns 3 Sutton, SE NE SE 7-8s-7e, dry, TD 3,024 ft., Renault 2,894 ft., Aux Vases sand 2,922 ft., Ste. Genevieve 2,946 ft., Rosiclaire 3,010 ft.

Wabash County: W. C. Lucas 1 Locer, NE NE SE 16-1n-13w, dry, TD 2,831 ft., Glen Dean 2,242 ft., Renault 2,710 ft., Ste. Genevieve 2,750 ft., McClosky 2,790 ft.

Washington County: Nash Redwine & Matthews 1 Finke, SE NW NW 20-3s-4w, dry, TD 2,496 ft., Aux Vases sand 1,178 ft., Ste. Genevieve 1,258 ft.

Wayne County: A. J. Slagter, Jr., 1 Rogers, NE NW SE 21-1s-8e, dry, TD 3,244 ft., Glen Dean 2,624 ft., Paint Creek lime 2,974 ft., Renault 3,101 ft., Ste. Genevieve 3,147 ft., McClosky 3,208 ft.

White County: T. B. Dirikson 1 Johnson, SW SE NW 32-6s-8e, dry, TD 3,215 ft., McClosky 3,144 ft.

New California Area

(Continued from page 51)

eral opinion among leading California geologists seems to be that the discovery wells have uncovered two separate fields.

The theory has been advanced that the 28-5 Russell-A has found an accumulation on a long, narrow anticline formed by thrusting against a fault which transverses the valley longitudinally (the Whiterock fault). At the surface this anticline apparently has a very short northwest plunge and southwest flank, with seemingly several hundred feet of closure. The northwest flank is believed to be broad and dips some 2 miles to the axis of a major syncline (the Morales syncline). The southwest flank is believed to be long and gentle with the discovery well located far down on this flank. If such is the case, the field seemingly would have an areal extent of approximately 400 acres.

The 37-30 Anderson-Colgrove is thought to have encountered a stratigraphic trap resulting from a fault overlap against the Caliente Range which borders the Cuyama Valley on the northeast. Since the extent of such traps can be determined only by extensive drilling, no speculation as to the size of the field can be made at the present time.

If, on the other hand, both discovery wells have uncovered a single accumulation, the field will be extremely large both in areal extent and in crude-oil reserves.

The Cuyama Valley is bordered on the north by the Carrizo plain and on the east by the Caliente Range. It is a large sedimentary basin approximately 50 miles long by 15 miles wide and located midway between the oil-producing areas of the San Joaquin Valley to the northeast and the coastal region to the southwest. The entire valley is part of a peculiarly long, deep, and narrow trough or graben about 300 miles long by 20 miles wide, which developed in the Upper Oligocene and sank rapidly throughout the Miocene. The marine record for these times is apparently complete along the axis of the trough, and is locally of great thickness. The Cuyama Valley itself probably emerged from the sea at the end of Miocene time, since subsequent sediments are thin and nonmarine. The entire area was profoundly deformed and eroded during the Quaternary, for the existing sediments were steeply tilted and locally overturned and overthrust. Due to the deep erosion of the larger anticlines, conditions requisite for the occurrence of major oil or gas fields previously have been thought to be absent and the area never has been highly regarded as a prospective oil-producing region despite oil seeps that occur there.

Drilling Conditions

Drilling conditions so far in the Cuyama Valley have been ideal. No caving or sloughing shale or high-pressure water or gas sands have been encountered. Principal completion problems, as in every successful wildcat, have been to take in the maximum section of productive oil sand, without taking in any water sand. This problem can be solved only by experience in drilling in the area.

Light, portable power rigs are employed for drilling in the area, and the great demand for this type of rig in the Cuyama Valley since the start of the boom has caused the drilling situation in the entire San Joaquin Valley to be extremely tight. Due to shallow depths (approximately 4,000 ft. total depth in the completed wells), only two strings of casing are set. These consist of a surface string of 13⅜-in. casing set at a depth of approximately 200 ft., and a water string of 6⅝ or 7-in. casing set at the top of the oil sand. Perforated liner is then set to the total depth and the wells completed as flowing wells.

Prior to the completion of its discovery wells, Richfield had leased a block of approximately 150,000 acres in the Cuyama Valley on the basis of its geologic study of the area. Since that time, leasing has been very active in the area with all major companies and several independents participating. Field reports are that bonuses as high as $120 per acre with royalties of 20 per cent have been paid for parcels as far away as 10 miles from the discovery wells.

In connection with these leasing campaigns, it has been announced that Navy Oil Co. (which drilled a wildcat good for 150 bbl. daily in the Cuyama Valley in January of this year) has made an operating agreement with Independent Exploration Co. whereby the latter will drill Navy Oil Co.'s holdings of approximately 900 acres which are located about 2½ miles east of the Richfield discoveries. Navy Oil Co., after completing its first well in the Cuyama Valley, attempted several offset wells without success. It remained for Richfield to make the strikes which started the boom.

Crude Outlets

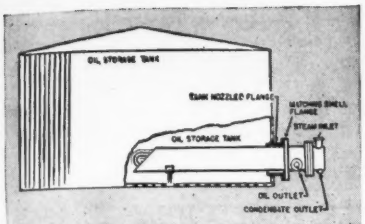
Richfield Oil Corp. is one of the two companies which have a major trunk crude line crossing the Wheeler Ridge. Richfield, in order to tie into this trunk line, will run a line from the Cuyama Valley to Maricopa, Calif., a distance of approximately 60 miles. The company already has construction on this line well under way and is expected to be running crude from the Cuyama Valley into the trunk line very shortly.

Future of Cuyama Valley

Although the Cuyama Valley has lain practically untouched by the exploratory drill for nearly half a century due to the contention that it is unfavorable for the accumulation of major oil reserves, Richfield has proved these contentions to be false and has opened a large new area to exploration and development. General opinion of California operators is that the field, or fields, so far uncovered are of primary importance and that they, as well as other Cuyama Valley fields which may be uncovered in the future, will have material bearing on the state's crude-oil reserves. It has been so long since a major field has been found in California that it seems unbelievable that such a large crude-oil accumulation as has been uncovered in the Cuyama Valley could still exist unknown in the state. The fact that such reservoirs still remain unknown, however, opens many new areas to exploration and development. The Cuyama Valley itself contains many structural and stratigraphic traps which may yet develop into some of the state's most prolific producing fields.

TABLE 1—DRILLING ACTIVITY IN CUYAMA VALLEY AREA

Company and well—	Location	Elev. (ft.)	Depth (ft.)	Latter part July 1948 Status
Federal Oil 1 Pacific-Continental	25-11n-28w	1,837	3,492	Coring
Frank & von Glahn 2 Indian	23-11n-28w	1,762	4,133	Drilling
George Noonan 1 Wallace	6- 9n-25w	....	....	Location
Richfield 17-5 Russell-A	5-10n-27w	2,097	3,438	Swabbing
Richfield 18-5 Russell-A	5-10n-27w	....	3,559	7-in. csg. at 3,380 ft., wall scraping
Richfield 38-5 Russell-A	5-10n-27w	....	....	Location
Richfield 11-8 Russell-A	8-10n-27w	2,149	4,009	Wall scraping
Richfield 31-8 Russell-A	8-10n-27w	2,123	3,640	Wall scraping
Richfield 41-8 Russell-A	8-10n-27w	....	....	Location
Richfield 48-30 F. R. Anderson	30-11n-27w	....	....	Grading location
Richfield 15-30 F. R. Anderson	23-11n-27w	....	....	Location
Richfield 85-25 Anderson-Norris	25-11n-28w	....	2,662	Drilling
Richfield 58-30 von Glahn & Frank	30-11n-27w	1,804	3,220	Drilling
Richfield 1 Cebrian Estate	23-11n-28w	1,933	3,124	Drilling
Richfield 1 Koch-B	29-11n-28w	...	...	Location-Suspended
Richfield 73-31 Quality	31-11n-27w	....	125	Drilling
Richfield 41-31 Quality	31-11n-27w	....	....	Location
Richfield 1 Victoria-Woods	9-10n-28w	....	703	Drilling
Richfield 1 Conklin	11-10n-28w	....	....	Location
Von Glahn & Leingang 1 Cole	11-10n-27w	....	1,949	Drilling



PARACOIL TANK SUCTION HEATER INSTALLATION

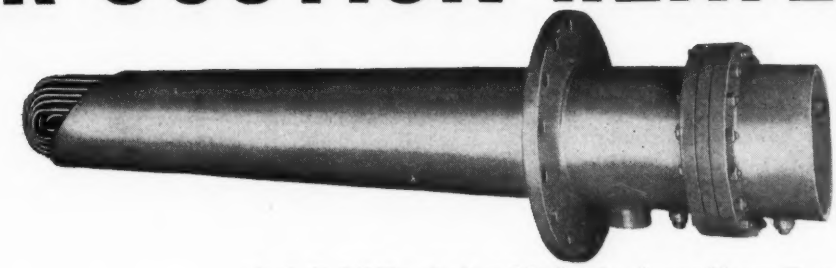
The shell is open at the inside end. The oil moves across the heating tubes as it passes through the shell to the suction connection outside the tank.

??? HAVING TROUBLE PUMPING HEAVY OILS?

??? CONCERNED ABOUT LOSSES RESULTING FROM VOLUME SHRINKAGE AT LOW OIL DELIVERY TEMPERATURES? ...THEN INSTALL

Paracoil

TANK SUCTION HEATERS



In Bulk Oil Terminals and Refineries the world over Paracoil Tank Suction Oil Heaters are licking the problem of economically preheating heavy viscous oils to permit their withdrawal from storage tanks. They are also preheating the lighter grades of fuel oils to their proper delivery temperatures to avoid the costly volume losses incurred when such oils are sold at low temperatures.

WITH PARACOIL TANK SUCTION OIL HEATERS

- **You Heat Only The Oil That Is Being Withdrawn From The Tank.** (Thus radiation losses resulting from heating entire tank contents are eliminated.)
- **Overall Steam Consumption And Heating Costs Are Held To A Minimum.**
- **Heater Tube Bundle Can Be Withdrawn For Inspection And Cleaning.** Breaking of oil suction line not necessary.
- **All Piping Connections And Gaskets Are Outside The Tank.**
- **U-Tube Design Permits Free Expansion And Contraction Of Tube Bundle.** Either high or low pressure steam can be used as the heating medium.

Prompt Shipments!
Our extensive stocks of tubing and pipe enable us to make quick deliveries to meet your immediate requirements.
Write for Descriptive Literature

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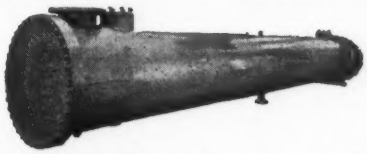

In addition to the Paracoil Tank Suction Heaters, we also design and fabricate Line Type Discharge Heaters of any capacity. Illustrated is a Paracoil Straight Tube Type Fuel Oil Heater for bulk station service—capacity 2,000 gallons per minute, No. 6 oil, 100°F to 160°F, steam at 15 psig. Weight 12 tons.

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NEW YORK 20, N. Y.

STATISTICS and T

WEEKLY WELL COMPLETIONS . . . WEEK ENDED JULY 31, 1948

	Total of all wells					Cum.		Wildcat completions and discoveries					Cumulative total, 1948				
	Comp.	Oil	Gas	Dry	Footage	1948	1947	Oil	Dist.	Gas	Dry	Total	Oil	Dist.	Gas	Dry	Total
New York	28	14	0	*14	34,549	903	883	0	0	0	0	0	0	0	0	0	0
Pennsylvania	49	22	4	†23	78,464	1,549	1,662	0	0	0	0	0	0	0	9	13	22
West Virginia	8	2	6	0	21,527	452	476	0	0	0	0	0	3	0	32	35	70
Ohio	32	10	12	10	72,858	774	751	0	0	1	1	2	2	0	9	19	30
Indiana	17	4	2	11	29,996	586	359	1	0	0	1	2	16	0	1	22	39
Kentucky	14	6	0	8	23,241	397	364	0	0	0	1	1	6	0	0	12	18
Illinois	49	22	1	26	129,529	1,303	1,151	1	0	0	13	14	29	0	1	192	222
Michigan	28	13	2	13	63,923	449	465	3	0	0	9	12	13	0	8	150	171
Kansas	57	24	12	21	193,761	1,756	1,461	1	0	0	7	8	34	0	4	242	280
Neb., Mo., Iowa	0	0	0	0	0	2	3	0	0	0	0	0	0	0	0	1	1
Oklahoma	85	45	7	33	374,699	2,318	2,343	2	0	1	16	19	74	7	17	372	470
Texas	273	166	16	91	1,094,228	6,678	5,167	12	0	2	40	54	190	18	60	1,172	1,440
North Central (Dist. 7-B & 9)	110	55	2	53	287,210	2,074	1,674	4	0	0	17	21	68	0	9	417	494
West (Dist. 7-C & 8)	69	59	1	9	323,720	1,823	1,222	4	0	0	7	11	40	0	2	131	173
Panhandle (Dist. 10)	12	10	2	0	36,652	356	249	0	0	0	0	0	0	0	2	6	8
Eastern (Dist. 5 & 6)	13	3	4	6	76,512	312	294	0	0	0	0	0	6	2	0	68	76
Gulf Coast (Dist. 2 and 3)	35	19	5	11	211,341	1,057	910	2	0	2	6	10	47	14	16	259	336
Southwest (Dist. 1 & 4)	34	20	2	12	158,793	1,056	818	2	0	0	10	12	29	2	31	291	353
Louisiana	57	42	3	12	273,437	1,288	784	2	1	0	1	4	28	15	3	119	165
Northern	34	24	2	8	107,303	858	432	0	0	0	0	0	2	1	0	60	63
Southern	23	18	1	4	166,134	430	352	2	1	0	1	4	26	14	3	59	102
Arkansas	0	0	0	0	0	165	151	0	0	0	0	0	3	0	0	50	53
Mississippi	6	6	0	0	53,932	228	277	0	0	0	0	0	2	1	3	46	52
Southeastern States	1	0	0	1	4,240	28	31	0	0	0	1	1	0	0	0	26	26
Montana	7	4	1	2	17,532	151	147	0	0	0	2	2	3	0	0	11	14
Wyoming	15	10	0	5	70,746	274	127	2	0	0	0	2	17	0	1	26	44
Colorado-Utah	7	5	0	2	34,824	142	113	0	0	0	2	2	0	0	2	28	30
New Mexico	12	7	1	4	55,250	357	300	0	0	0	2	2	4	1	1	29	35
California	62	49	1	12	232,488	1,669	1,152	7	0	1	7	15	66	0	3	170	239
Total United States	807	451	68	288	2,859,224	21,469	18,167	31	1	5	103	140	490	42	154	2,735	3,421
Total previous week	791	436	60	295	2,658,362	20,662	17,387	24	3	7	110	144	459	41	149	2,632	3,281
Total Aug. 2, 1947	780	392	112	276	2,560,088			16	2	8	87	113	380	46	119	2,251	2,796

Service wells included: *14, †21.

CRUDE PRICES AND REFINERY ACTIVITY

GRAVITY SCHEDULES

Top prices include all gravities above grades designated, and low prices include all gravities below grades designated:

Gravity—	Signal Hill, Calif.	Oklahoma, Kansas	Gulf Coast Tex.*	West Tex.†
18-18.9	$2.17	....	....	....
19-19.9	2.19	....	....	....
20-20.9	2.21	$2.25	....	$2.12
21-21.9	2.23	2.27	....	2.14
22-22.9	2.27	2.29	....	2.16
23-23.9	2.30	2.31	....	2.18
24-24.9	2.34	2.33	$2.56	2.20
25-25.9	2.38	2.35	2.58	2.22
26-26.9	2.41	2.37	2.60	2.24
27-27.9	2.45	2.39	2.62	2.26
28-28.9	2.49	2.41	2.64	2.28
29-29.9	2.52	2.43	2.66	2.30
30-30.9	2.56	2.45	2.68	2.32
31-31.9	2.59	2.47	2.70	2.34
32-32.9	2.62	2.49	2.72	2.36
33-33.9	....	2.51	2.74	2.38
34-34.9	....	2.53	2.76	2.40
35-35.9	....	2.55	2.78	2.42
36-36.9	....	2.57	2.80	2.44
37-37.9	....	2.59	2.82	2.46
38-38.9	....	2.61	2.84	2.48
39-39.9	....	2.63	2.86	2.50
40 and above		2.65	2.88	2.52

*For crude from Daboval, El Campo, and Sand Point. †Includes Lea County, New Mexico. Last general price change represented a 50-cent increase becoming effective December 6, 1947. (For detailed price changes in all fields see The Oil and Gas Journal, January 1, 1948, page 107.)

A.P.I. REFINERY REPORT, WEEK ENDED JULY 24

District—	Crude runs, daily avg.	(Thousands of barrels) Production: Gasoline†	Kerosine	Gas & dist. oil	Residual	Stocks at refineries, bulk terminals, in transit and in pipe lines: Gasoline*	Kerosine	Gas & dist. oil	Residual
East Coast	885	2,277	329	1,128	1,504	24,756	9,273	16,060	10,880
Appalachian:									
District 1	99	358	50	102	91	2,059	391	532	401
District 2	32	84	3	40	74	875	78	202	128
Ind., Ill., Ky.	945	3,645	406	863	1,102	20,652	3,601	7,956	5,225
Okla., Kans., Mo.	454	1,643	187	570	523	8,574	1,271	4,143	1,925
Inland Texas	252	1,062	99	201	396	3,077	811	692	828
Texas Gulf Coast	1,381	4,431	636	2,056	1,852	15,109	2,100	7,444	6,706
La. Gulf Coast	447	1,174	321	585	608	5,176	1,287	3,388	1,704
N. La. and Ark.	85	215	53	94	146	2,245	509	459	298
Rocky Mountain:									
New Mexico	12	42	7	12	28	75	25	27	32
Other Rocky Mtn.	157	437	29	187	218	2,382	238	1,082	889
California	842	2,511	46	787	2,283	15,661	798	12,771	35,530
July 24, 1948	5,591	17,879	2,166	6,625	8,825	100,641	20,382	54,756	64,556
July 17, 1948	5,633	17,524	2,207	7,382	9,008	100,701	19,773	53,385	63,170
July 26, 1947	5,202	16,166	1,903	5,777	8,737	85,955	16,962	45,047	52,414

*Finished and unfinished. †At refineries, including natural blended.

Bureau of Mines crude-oil stocks 221,297,000 bbl. as of July 24—up 282,000 bbl. One year ago 231,357,000 bbl.

FLAT CRUDE PRICES

Representative posted schedules per bbl.	
East Texas	$2.65
Kettleman Hills, California*	2.14
Beauregard Parish	2.60
Illinois Basin	2.77
Pecos County, Texas (Yates)	2.33
Bradford, Pennsylvania	3.00
Eastern Ill. and Western Ind.†	2.77
Tomball, Texas Gulf Coast	2.83

*37°-37.9°. †35° and above.

TRENDS

DAILY AVERAGE PRODUCTION FOR WEEK

	July 31 crude oil	B. of M. July demand	July 24 crude oil
Alabama	1,350	1,500	1,400
Arkansas	81,200	88,000	82,560
California	953,600	950,000	947,750
Colorado	45,600	50,000	46,310
Eastern	64,100	66,000	63,800
Florida	875	800	825
Illinois	170,800	173,000	170,400
Indiana	20,800	16,000	20,600
Kansas	300,900	304,000	292,900
Kentucky	24,600	25,000	24,300
Louisiana	476,200	492,000	476,450
North Louisiana	113,100	.....	113,350
South Louisiana	363,100	.....	363,100
Michigan	41,200	46,000	45,900
Mississippi	126,000	125,000	132,485
Montana	26,470	26,000	26,370
Nebraska	400	700	400
New Mexico	128,920	138,000	128,920
Oklahoma	423,150	432,000	420,200
Texas	2,415,475	2,540,000	2,415,475
Dist. 1 (Southwest)	29,050	.....	29,050
Dist. 2 (Southwest)	178,400	.....	178,400
Dist. 4 (Southwest)	246,950	.....	246,950
Dist. 3 (Gulf Coast)	489,950	.....	489,950
Dist. 5 (Eastern)	48,600	.....	48,600
Dist. 6 (Eastern)	121,500	.....	121,500
East Texas field	303,000	.....	303,000
Dist. 7-C (West)	42,725	.....	42,725
Dist. 8 (West)	684,100	.....	684,100
Dist. 7-B (W. Central)	49,300	.....	49,300
Dist. 9 (N. Central)	133,700	.....	133,700
Dist. 10 (Panhandle)	88,200	.....	88,200
Wyoming	149,270	156,000	150,410
Total United States	*5,450,910	5,630,000	5,447,455

Change from prev. wk., up 3,455

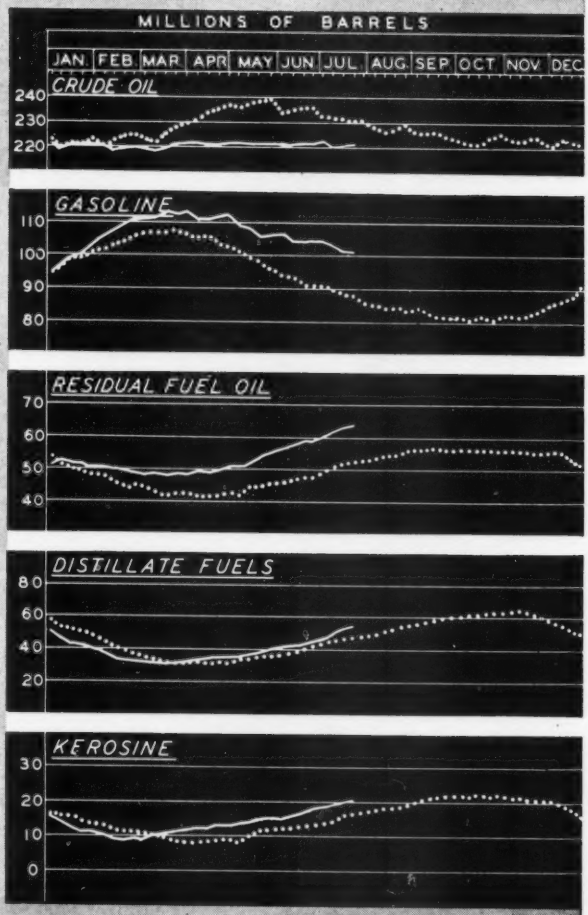
Total production January 1-July 31 .... †1,164,836,585 bbl.

Same period last year (crude plus cond.) 1,048,358,790 bbl.

*Not incl. 74,185 bbl. condensate. †Incl. 15,841,855 bbl. condensate.

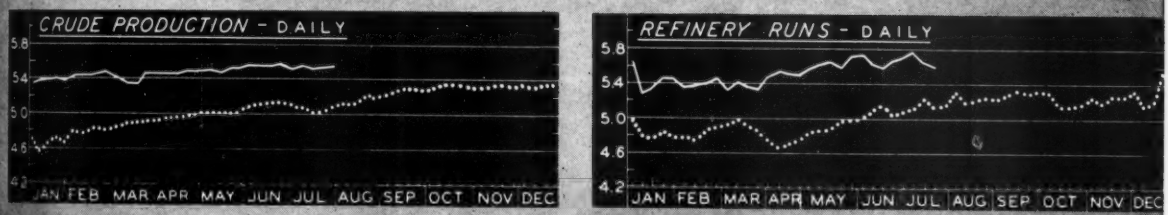
STOCKS IN UNITED STATES

---- 1947 ——— 1948



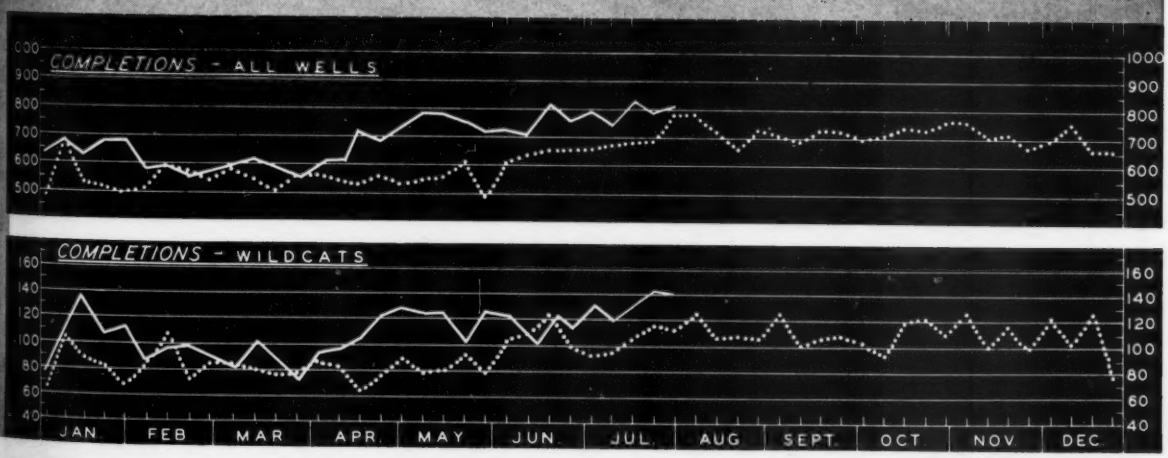
DAILY OPERATIONS

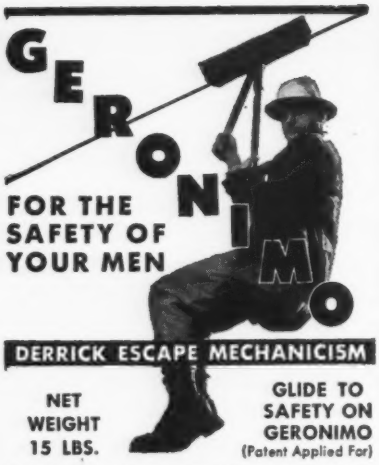
---- 1947 ——— 1948



WEEKLY COMPLETIONS

---- 1947 ——— 1948





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Washington Fruit Ranch

Estate Offers Fine Property

Improvements valued at $65,000 including residence, 3 additional dwellings, packing house, cold storage warehouse, machine shops, 2 sprayers, 2 tractors and other necessary equipment. 210 acres on a beautiful mountain river planted with 3950 apples, 200 pears, and 54 cherries with total bulk pick of 54,000 boxes last year. Total value over $100,000 offered by widow for $59,000.

MAXINE LARSON
Agent
2630 S. W. Patton Rd.
PORTLAND, ORGEON

MARKETS

SOME marketers in the Mid-Continent area last week expressed the belief that the recent military demands for 1,700,000 bbl. of motor gasoline "will definitely affect the market" for this material. Early this week, however, prices remained unchanged and demand continued strong. Whether the new military demands would cause the high premiums to come back could only be guessed at.

"Desirable Balance" Continues

One Group 3 refiner reported a sale of 3 cars of housebrand gasoline at 12½ cents per gallon. This however, appeared to be greatly on the "high side" as most reported sales on the spot market were moving at around a cent less than this. The needs and available supply of gasoline continued to remain in seemingly "desirable balance," but marketers were anxiously awaiting the next few days for a better indication of what effect the military demands will have on the situation.

No change was reported in the extreme easy market on residual oil. Stocks have been increasing regularly while demand has been dropping along with price levels. The drop is largely attributed to seasonal influences.

No. 2 burning oil continued to be firm with most of the material moving at about 9¼ cents per gallon. No seasonal drop in demand for this product was seen by most observers. Consumer demand for summer fill up needs was said to be generally strong, and nearly all marketers were optimistic that the industry would fulfill burning-oil needs for this coming winter.

Lubricating oils in the Mid-Continent area continued generally strong, particularly bright stock material; a light but perceptible easing off in demand for neutrals was reported by one supplier. Price levels for lube products, however, remained unchanged. Sales of natural gasoline, Grade 26-70, were reported continuing strong. One refiner said that tank cars are not as easy as suppliers would like to see them.

Some slight easing in the previously heavy demand for lubricating oil was reported last week on the Gulf Coast area. One supplier said that it was noticeable, though "not enough to make any stir about." Prices remained unchanged in postings of manufacturers. There was speculation as to whether the lube market is beginning to feel the effects of the extensive construction of lubricating-oil production facilities taking place on the Gulf Coast.

Demand for motor fuel to contract suppliers continued at its near seasonal peak, but independent spot-market sellers continued to report a disinclination of buyers to pay high premiums. Much heating oil was said to be moving to storage, and little kerosine was being offered on the market.

New York Trading Is Light

Open spot-market trading on almost all petroleum products in the New York Harbor area continued light last week. Most suppliers reported their stocks of all heating and fuel oils more than enough to meet current low consumer demand, but sales in nearly all cases were being limited to old customers. Suppliers indicated that heavy fuel oil is the only product presenting any storage problem at present, as is reflected by the weakening tone of spot-market prices in New York Harbor.

Representative Quotations

Representative spot-market quotations of leading suppliers as of August 2, 1948. Figures are f.o.b. plant for tank-car shipment in cents per gallon, except for residual fuel oil which shows the price per barrel and wax, in cents per pound.

GASOLINE, KEROSINE, AND FUEL OILS

	Mid-Continent Group 3	New York Harbor	Texas Gulf Coast
Regular gasoline, 73-75 octane	10½-12	11.6-12* 10.5-11.9†	10.9-12½
Premium gasoline, 78-80 octane	11½-13	10.6-13.4	12.9-13¼
42-44 w.w. kerosine	9½-10	10.3-11.9	10¼-10½
No. 2 straw fuel oil	9-9½	9.4-10.9	9.05-10
No. 6 residual	$2.35-2.50	$3.03-3.57	$2.35-2.65

*Branded (74-76 octane); †Unbranded (74-76 octane).

NATURAL GASOLINE

	Group 3	North Texas	N. La.
Grade 26-70	8½	8	8¼
Grade 18-55	10.2	9.6	9.9

LUBRICATING OILS
South Texas

200 vis., No. 2-3 neutral	12-14.5
750 vis. No. 3-4 neutral	15-17.25
2,000 No. 5-6 neutral	17-21

LUBRICATING OILS
Mid-Continent

150-160 vis., D bright stock, 0-10 pp.	30-3
200 vis. No. 3 neutral, 0-10 pp.	20-2

Western Pennsylvania

145-155 vis. 10 p.t. bright stock	4
180 vis. p.t. neutral	4

CRUDE-SCALE WAX
Mid-Continent

130-132 A.S.T.M. melting point	6½-6¾

EQUIPMENT MEN ... in the News

Foster Wheeler Announces Personnel Changes

H. B. WALLACE

Foster Wheeler Corp., New York, has announced three changes in its sales staff.

H. B. Wallace, Jr., has been appointed manager of steam sales for the corporation. He had been manager of the New England territory in Boston since his return from the armed service.

A. F. DOWNHAM

W. H. HARDIE

A. F. Downham has been appointed manager of the New England territory succeeding Wallace. Downham was formerly in the sales department of the Pittsburgh office.

W. H. Hardie has become associated with the New York Sales office and will concentrate on the sales of steam generators, pulverizesr, superheaters, and related products.

Frontier Chemical Expands Plant

Frontier Chemical Co., Midland, is increasing the current expansion program at its Denver City plant to produce 25,000 tons of 20° Be'. muriatic acid and 7,500 tons of caustic soda annually. Facilities for the manufacture of solid and flake caustic soda are included. The project involves an expenditure of approximately $400,000, and will more than double the original production of these products. Completion of the entire program is scheduled by the end of this year.

Turco Choses New Plant Site

Due to the demands of an expanding national market, McCook, Ill., has been chosen as the site of the new, modern plant of Turco Products, Inc., manufacturers of specialized industrial cleaning compounds. The new plant is an addition to Turco's present manufacturing facilities at Chicago, Los Angeles, and Houston.

Tube Turns Acquires Pennsylvania Forge Corp.

In the biggest move to date in its program of steady expansion, Tube Turns, Inc., Louisville, has acquired Pennsylvania Forge Corp. Announcement of the purchase was made by George O. Boomer, president of Tube Turns, Inc., and its affiliate, Girdler Corp. He will be chairman of the board of the Pennsylvania firm, which is one of the nation's best-known and most highly regarded manufacturers of flanges and custom forgings. James S. Kerwin, president, and W. T. J. Huggard, secretary and treasurer, and other officers will continue in their present capacities, and there will be no change in the personnel of the various departments. The business of the new subsidiary will continue to be operated under the name of the Pennsylvania Forge Corp.

Rey Supply Opens New Orleans Office

Rey Supply Co., oil-field and marine-equipment suppliers for offshore operations, has opened a new office in the International Trade Mart in New Orleans, J. Paul Ratliff, Jr., has announced. The company is oil-field distributor for "Di-Lok" anchor chain and the Johnson-Type deck machinery.

Rey Supply Co. has other sales and service points at 2122 Kentucky Street, New Orleans; Intracoastal Canal, Harvey, La.; and 4 South 15th Street, Philadelphia.

Anderson Promoted At Worthington

Worthington Pump & Machinery Corp. announces appointment of Harold T. Anderson as assistant to the general sales manager, in charge of sales production relations, with headquarters at Harrison (N. J.) Works.

Duraloy Appoints Dear

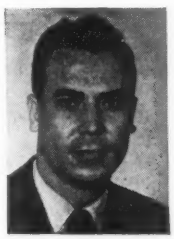
Duraloy Co. of Scottsdale, Pa., announces the appointment of J. B. Dear as assistant sales manager. Dear has been with the company for many years in the factory sales office.

Irvine Returns to Pressed Steel Tank

Norman R. Irvine, according to a recent announcement by Pressed Steel Tank Co., Milwaukee, has returned to that organization as a sales representative, after spending over 5 years with the United States Army. For the majority of his time in the army Irvine was concerned with atomic research.

New Engineering Firm Founded

Process & Industrial Engineering Co. is a newly formed organization that has recently entered the consulting and engineering field in Houston.



R. E. HOWARD, JR.

D. W. EDLEMAN

C. M. MILLER

W. J. RICE

The company is a partnership of four engineers of long association and experience: Roy E. Howard, Jr., mechanical engineering graduate of Rice Institute, who holds the position of engineering manager; D. W. Edleman, who attended Chicago Technical College prior to entering the Merchant Marine during the war, and who has charge of the vessel and equipment design department; Charles M. Miller, who attended Texas A. & M. College prior to joining the Armed Services, and who is in charge of layout and piping work; and W. J. Rice, chemical engineering graduate of Rensselaer Polytechnic Institute and a registered professional engineer in Texas, who does the

process and development work. The four men have been associated for several years while in the employ of Dow Chemical Co.

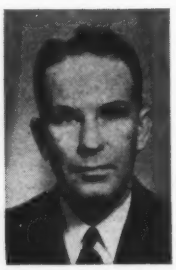
PIECo is engaged in process and industrial engineering of varied nature in conjunction with general construction, which enables it to turn out plants on a "turnkey" basis. The company has taken offices at 2205 Bellaire Boulevard.

Baker Promotes Personnel

Baker Oil Tools, Inc., announces recent promotions in the central division as follows: R. D. McBrian, formerly West Texas district manager with headquarters in Odessa, has been transferred to central division headquarters in Houston as assistant division sales and service manager.

R. D. McBRIAN

C. C. TAYLOR



R. S. BEDILLION

C. A. GREVE

R. L. RAMBY

C. C. Taylor, formerly branch manager in Odessa, replaces R. D. McBrian as district manager for West Texas, with headquarters at Odessa. R. S. Bedillion, formerly branch manager at Victoria, has moved to Odessa as branch manager. C. A. Greve, formerly staff assistant at Houston, has been transferred to Victoria as branch manager. R. L. Ramby, formerly sales and service engineer in Corpus Christi, has been promoted to branch manager, with headquarters in Corpus Christi.

Eastman Holds Board Election

Stockholders of the Eastman Oil Well Survey Co. at their annual meeting in Denver reelected to the board of directors H. John Eastman, president; Gordon Jackson, vice president and general manager; Phyllis M. Freeland, secretary-treasurer; and Ross E. Wiley, Pacific Coast division manager. Directors on the board were increased from four to seven by the election of William G. James, Gulf Coast division manager; C. P. Collins, Rocky Mountain-Mid-Continent division manager; and Ted W. Sess, general sales manager.

The newly elected board of directors then reelected Eastman as president, Gordon Jackson as vice president and general manager, and Phyllis M. Freeland as secretary-treasurer, and elected William G. James and Ross E. Wiley as vice presidents.

Dykes Wins Snap-On Tool Set

Bethlehem Supply Co. announces that A. J. Dykes, formerly driller for Kirkwood & Morgan of Alice, Tex., won the Snap-On "Rough-Neck" tool set which was given away by Snap-On Tool Corp. at the Bethlehem Supply Co. display during the International Petroleum Exposition. Dykes owns Oil Field Motor Service at Alice, and will definitely make good use of these tools.

Ground Broken for West Coast Plant

Ground was broken recently on a 10-acre site at 32nd and Walnut streets, Signal Hill, Calif., where Pacific Valve & Pump Co. will build the largest manufacturing plant of its kind west of Chicago.

Cost of the new building, together with the machinery and the site, will approximate $500,000, according to owners, Mrs. Charlotte Dumm and her four sons, Bob, Jack, Irving, and Howard Dumm.

A few years ago the Dumm brothers were putting down their first oil wells and branching out into the production and repairing of steel valves and oil-field equipment. Their present plant, which already meets a monthly payroll of $50,000, was built from a humble beginning on Cherry Avenue.

Elliott Places Engineers

F. W. Dohring, vice president in charge of sales, Elliott Co., Jeannette, Pa., announce the assignment of the following graduate engineers to district offices, upon their completion of a 1-year training course: F. C. Hohenstein, Chicago; M. C. Seeman, Cleveland; G. J. Greaney, Jr., Houston; J. U. Kauffman, St. Louis; R. L. Henry, Tulsa; and W. W. Gotherman to Washington, D. C.

Ideco Changes Personnel In Export Office

Announcement has been made from Dallas headquarters of changes in personnel in the New York export office of International Derrick & Equipment Co.

A. L. WORACEK

B. V. BROWN

A. L. Woracek has been appointed export manager of sales of steel buildings, derricks, towers, and machinery. Woracek has been with Ideco for 23 years and has been associated with all phases of export operations.

B. V. Brown is now located in the New York export office and will act as export manager of sales of machinery and supplies. Brown was formerly manager of purchases and stock control of Ideco's supply store division in Dallas and has a broad knowledge of oil field operations.

James E. McGuire, who for the past 2 years has been buyer in Ideco's Dallas export office, has been transferred to New York. McGuire will fill the position of export purchasing agent and office manager in the New York office.

Innes Joins Jefferson Chemical

George L. Innes has joined the sales department of Jefferson Chemical Co., Inc., with headquarters at 30 Rockefeller Plaza, New York. He was formerly with Nopco Chemical Co., Harrison, N. J.

Winn Transferred to Houston

Robert H. Winn, electric-logging well-service superintendent for Halliburton Oil Well Cementing Co., has been transferred from the Eastern division headquarters at Flora, Ill., to the Houston office where he will serve in the same capacity.

Marsh Succeds Haskell

William P. Marsh, Jr., executive vice president, has been elected president of U. S. Industrial Chemicals, Inc. He succeeds Glenn L. Haskell, who is retiring and becomes vice chairman of the board of directors.

OIL FIELD AND OIL WELL SUPPLIES

FOR SALE

We offer, subject to prior sale, the following equipment and supplies, formerly used in pumping 5000-foot wells:

75,000 feet 2-inch Upset Tubing

20,000 feet 5½-inch 17-pound Casing

7,000 feet 7-inch 24-pound Casing

2,000 feet 1-inch Galvanized Line Pipe

14,000 feet 2-inch Galvanized Line Pipe

4,000 feet 2½-inch Galvanized Line Pipe

Ten J-16-W American Underpull Pump Jacks, 2000-lb. Master Weight

Eight 2" x 1" x 25/32" x 12 Axelson Sure Seal Pumps

Two Reed Air Balance Pumping Units

Two 25 HP L.A. Electric Motors with Adj. base

Two Hercules AC Gas Engines PU-1487U complete with 11" x 4" Groove Pulley, Adj. base

One WXC Hercules Gas Engine No. 174549 11" x 5" Groove Pulley, Adj. base

Switch Boxes, Safety Switch, Copper Wire, Transformer

Seven 94-foot Galvanized Emsco Derricks; Capacity 333,000 lbs.

Five 125-lb. BS&B Separators

Six High 500-barrel BS&B Tanks

Three 300-lb. BS&B Gun Barrels

31,600 feet ⅝-inch Sucker Rod

30,260 feet ¾-inch Sucker Rod

All of the above material has been well cared for, and is in excellent condition. Write, wire or phone—

H & H WELL SERVICING CO.

Phone 5494

Robstown Road **Corpus Christi, Tex.**

Classified Advertising

The Market Place for the Oil Industry

UNDISPLAYED

All ads, 12 cents a word. Minimum charge, $3.00 per insertion.
Centered Line, any ad, $1.00.
Box Numbers count 9 words when replies are to be sent to our Tulsa Office. Replies forwarded without charge.

DISPLAYED, PER INCH

$12.00 per column inch per insertion. One-point border and 12-point capitals are allowed. Larger type sizes not accepted.

All classified advertising payable in advance.
10% Discount if 3 insertions are ordered at one time.
COPY DEADLINE, 9:00 a.m. Monday prior to each week's issue.

THE OIL AND GAS JOURNAL
P. O. Box 1260, TULSA, OKLAHOMA

BUSINESS OPPORTUNITIES

PIPE YARD FOR SALE
Wonderful opportunity for anyone interested in used oilfield material business. We have had large business volume in one of East Texas' best locations. Trucks, inventory, warehouse, offices, racks and fenced yard for sale at $18,000.00. Good reasons for selling. Kilgore Pipe & Supply Co., Kilgore, Texas.

PATENT ATTORNEYS

PATENT Practice before U. S. Patent Office. Validity and Infringement Investigations and Opinions. Booklet and form "Evidence of Conception" forwarded upon request. Lancaster, Allwine & Rommell, Registered Patent Attorneys, Suite 418, 815-15th Street, N.W., Washington 5, D. C.

LEGAL BLANKS

BURKHART LEGAL BLANKS since 1900. Oil-Gas (all states), Business, Real Estate Legal Forms, Leases, Revised With Government Regulations, Commercial Printing, Catalog and Samples on Request. Burkhart Printing & Stationery Company, 115 South Cincinnati, Tulsa 3, Oklahoma.

EQUIPMENT FOR SALE

FOR SALE: Wilson Master Model Winch powered by 6 MZR Waukesha engine. Unit mounted on one and one-half ton Chevrolet truck equipped with fifty foot single pole telescoping mast. Terms. Melton Supply Company, Seminole, Oklahoma.

REFINERY EQUIPMENT

2—Hot oil pumps — operable condition. Union Simplex 2¼ x 5¼ x 20—#166275-R (steel fluid ends).

1—Air compressor, operable condition. Ingersoll-Rand #61852. F.R.I. 12 x 12 x 10. New air chamber in 1940.

1—Reboiler—Mfg. by Jos. A. Coy, Tulsa. 24-10-6-135. New 6-13-44. 4-3-44. H-42-TH 2000#. Serial #122. Shell WP 150# @ 450° —tested 225#. Tubes WP 250# @ 400° F. Tested to 375#.

1—Gaso pump 3½ x 10 gear driven—135 bph. @ 400# psi. Operable.

1—Franklin valveless engine — Model #4-01 35 hp. with belt clutch and circulating pump and belt.

25,000'—3" OD PE invasion tubing new. .049 wall. Electric weld, 2.26# per foot.

ONYX REFINING COMPANY
Box 330
ABILENE, TEXAS

EQUIPMENT FOR SALE

FOR SALE: 1380' 6⅝" x 25.2# Grade D, Range 2 Drill Pipe with 7¾" O.D. A.P.I. Regular Tool Joints. Has drilled only 1300' of hole. **Lucey Products Corporation, Tulsa, Oklahoma.**

6000' 3½" OD 5# and 4000' 4" OD 6# seamless, plain end, random length, 30' to 40', strictly #1. Take all 50c, M. J. Regan, Coffeyville, Kansas.

PIPE FOR SALE: Good used Lapweld oil and gas well casing sizes, 5½" OD 13#, 7" OD 17#, 7" OD 20#, and 2⅜" OD 4½ # tubing. Reasonable price. Write or call. P.O. Box 1065, Parkersburg, W. Va. Phone 895.

FOR SALE: L-71 Cardwell Draw Works: Allis-Chalmers Double Pole Type "E" mobile unit; Allis-Chalmers Single Pole Type "UM" mobile unit. All A-1 condition. P.O. Box 3246. Corpus Christi, Texas.

COLD Drawn Seamless tubing in standard iron pipe size from ⅛" to 1½" direct from mill. Immediate shipment. Invention & Research, 5921 Troost, Kansas City 4, Missouri.

FOR SALE

12—230 H.P. Type 10 Bessemer New 17" Power Cylinders complete ready to run with 16" to 18" Compressors. 1—230 H.P. Clark Horizontal with Compressors. Located Salem, Illinois.

ENGLE PETROLEUM, Incorporated
Box 655, Evansville, Indiana

STEEL TANKS IN STOCK

14 New Bolted 10,000, 3,000 & 1,000 Bbl. cap., at New York & New Orleans.

6 New 30,000 Gal. & 4 New 15,000 Gal. 250 lb. pres. A.S.M.E. propane.

DARIEN CORP.
60 E. 42nd St., New York 17, N. Y.

FOR SALE
DIESELS and PUMPS

Six new 1947 unused 475 BHP 5 cylinder Baldwin Model VG Diesel Engines, four connected to Ingersol-Rand Multi-stage Centrifugal Pumps with Farrel-Birmingham Step-up Gears and two connected to Worthington Horizontal Triplex Double Acting Pumps, all units complete with Falk Couplings, Lummus Coolers, other accessories. Location Ohio, immediate delivery. Direct inquiries to

THE BUCKEYE PIPE LINE COMPANY
Joseph Steele, Purchasing Agent,
Room 2200, 30 Broad Street,
New York 4, N. Y.

WE BUY and SELL

Steel Pipe and Tubing
Pipe Fittings—Well Casing
Culverts and Valves

SONKEN-GALAMBA CORP.

2nd & Riverview, Kansas City 18, Kans.

EQUIPMENT FOR SALE

FOR SALE—1 Rotary drilling rig, 65' mast, Light plant, 1000' 4½" drill pipe, 1 drill collar, Misc. bits and reamers, New blocks Webb Wilson Tongs, 35' Kelly, 85 HP. Buda Drilling Engine, 120 HP. Chrysler Industrial Engine. 2—2½-ton GMC Trucks, 1 pole trailer, 1—40-bbl. water tank, 1—Rex 10 M water pump, all necessary hand tools. Rig is now drilling. Telephone 62-1560 Oklahoma City or 793 Guymon, Oklahoma.

FOR SALE: 7500' of 6⅝" O.D. 20 lb. casing, long couplings, 3" taper thread, smooth inside and out. Price $3.00. M. J. Regan, Coffeyville, Kansas.

FOR SALE at our Chase, Kansas, production office, 1 used Allis-Chalmers Model U-6 Skid Type Well Servicing Winch. $1500. Cities Service Oil, Patridge, Bartlesville, Okla.

DRILL STEELS, 1" Hex. Hollow, shanked and threaded, 8' and 10' lengths, new, approx. 12 tons available. Will sell all or any portion on a per lb. or per length basis. Julius M. Fogelman, 1649 Perkiomen Ave., Reading, Penna.

USED Le Roi 6-, 8-, and 12-cylinder gas engines, complete and in A-1 condition for oil industry power. Priced to sell. Also one Model NKU Waukesha $1500. Write or call today. General Machine & Supply Company, P. O. Box 72, Wichita Falls, Texas.

FOR CABLE TOOLS
DEGEN PIPE AND SUPPLY CO.
Box 107, Red Fork Station, Tulsa, Oklahoma

FOR SALE

NEW 26" O.D. STEEL PIPE: .250 and .3125 Wall. Electric Weld Mill Seconds. No Visible Defects.

CENTRAL SUPPLY COMPANY
101 West Cameron 3-7552
Tulsa, Oklahoma

FOR SALE

No. 83 Speed Star Spudder, mounted full trailer on hard rubber wheels, 4,000' drilling and sand lines. Complete tailing-in tools, dog house, light plant, etc. Very portable, good condition. Now working two miles east of Winfield, Kansas. W. R. Bowman, 214 Kennedy Bldg., Tulsa, Okla. Phone 7-3018 or 2-2633.

FOR SALE—FT. WORTH SPUDDER
Super "D" Excellent Condition

Titus et al lease, Berryman #3 in Sec. 25-11-8, Okfuskee County, East Cromwell Field. 9 miles SW Okemah.

HIGGINS DRILLING COMPANY
725 Wright Bldg. Phone 4-2588
Tulsa, Oklahoma

1000 KW
GAS ENGINE GENERATING PLANT

Now in use—available September 1st.

2 Clark Model RA-8—875 HP—327 RPM Vertical Angle "Super 2" Two Cycle 8 cylinders 14" x 14" Gas Engines.

Direct connected to two 625 KVA, 500 KW, 327 RPM, 2300 Volt, Westinghouse Generators—Belted Exciters, Dead Front Switchboard Heat Exchangers, Air Cleaner, Circulating Pumps.

WEIGHT EACH—78,400 LBS.

MAY BE INSPECTED MONDAY THRU FRIDAY. PICTURES AND COMPLETE SPECIFICATIONS AVAILABLE.

THIS IS AN EXCEPTIONAL BUY

ROY A. BERENTZ CO., INC.
Electrical and Mechanical Equipment
P. O. Box 564—Phone C4-4559
Houston 1, Texas

EQUIPMENT FOR SALE

FOR SALE: 1946 FAILING 314-C Rotary Drill Rig mounted on 2½ Ton GMC, used very little and in like new condition. Rated capacity 1500'. Fully equipped with Bailing Unit, Automatic Chuck, Swinging Spider, Tools, etc. $10,000. W. D. Thomas, Rock Springs, Wyo.

---

600 New Nordstrom 8" semisteel Valves. Tested 200 psi., weight 320 lbs. per valve. Suitable oil, gas, water. Attractive price.

SANDFORD STEEL PRODUCTS CO.
Phone Allegheny 5220
2681 Preble Ave.,
Pittsburgh 12, Pa.

FOR IMMEDIATE DELIVERY

Two new 20,000-barrel A.P.I. all-welded storage tanks. Fabricated to 12-C specifications.

SAPULPA TANK CO.

SAPULPA OKLAHOMA

PARTS FOR ARMY TRUCKS

New and Used

Largest stock in America, 6x8, 6x4, 4x4, 4x2. All items guaranteed. Largest auto wrecking house in the west with most complete stock of new and reconditioned parts for all cars and trucks. New jeep power units complete with radiators and stub shafts. Fast service.

PIONEER AUTO WRECKING CO.
732 W. 13th Ave. Denver 17, Colo.

FOR SALE
STAINLESS STEEL
Naphthenic Acid Plant

One—36" I.D. x 32' x ¼" Shell Stainless steel Fractionator with 7'-7" skirt—with 10 trays.

Four—5" x 3" x 6" Union Simplex Steam Pumps with solid stainless fluid ends.

One—Heater and Reboiler with 1" I.D. tubes and bolted return headers—stainless.

One—Condenser with ¾ I.D. tubes and bolted return headers—stainless.

Charge and product piping — stainless steel.

Analysis of stainless steel:
18% Chrome
8% Nickel
3% Molybdenum
½ to 1% Columbium

PLANT IN EXCELLENT CONDITION.
WE INVITE YOUR INSPECTION.

PROCESS CONSTRUCTION CO., Inc.
20700 South Figueroa Street
Torrance, California
Los Angeles Phone:
PLeasant 2-6366
PLeasant 1-6660

EQUIPMENT FOR SALE

FOR SALE: 36 L Bucyrus Spudder, 10" to 6" Spang tools. Box 105, Rose Hill, Virginia.

FOR SALE: 3—7" x 14" Clark Bros. RA-3 Compressor Cylinders complete, Type VTL, 2" Piston. Two with adjustable loaders, one with lift valve. First class condition. West Virginia Gas Corp., Box 1433, Charleston, West Virginia.

1—36 L Bucyrus complete with big hole tools and dog house, A-1 condition. 1—R L Cardwell complete with tools, steel dog house, butane tank, A-1 condition. Phone 2032, Henderson, Ky.

FOR SALE: FRANKS MODEL-D Shothole Drill on 1944 Ford Truck, good condition. Seismograph Drilling Supply Company, Box 607, Britton, Oklahoma.

FOR SALE

Large or small quantities, ALL NEW

6" Wheatley Gate Valves, 500 lbs. W. P., Iron Body, Brass Trim, Flanged, extra heavy, Series 30. Priced @ $37.50 each.

6" Wheatley Combination Gate and Check Valves, 500# W.P., Iron Body, Brass Trim, Flanged, Extra Heavy, Series 30. Priced @ $55.00 each.

4" Wheatley Gate Valve, 500# W.P., Iron Body, Brass Trim, Flanged, Extra Heavy, Series 30. Priced @ $27.50.

4" Wheatley Combination Gate & Check Valve, 500# W.P., Iron Body, Brass Trim, Flanged, Extra Heavy, Series 30. Priced @ $47.50.

Accompanying Flanges for the above at a slight additional cost.

Thousands of Victualic Type Couplings, New. Ideal for your 6" Invasion Pipe.

ALL MERCHANDISE F.O.B. SAN ANTONIO, TEXAS

Morris Brooks Supply Company, Inc.
Box 2756
1425-1600 So. Alamo Street
San Antonio, Texas

FOR SALE

10—Closed heavy riveted steel tanks, approx. 55' in diameter x 80' high, from ¼" to ½" in thickness—APPROX. 1,400 TON—formerly used for grain storage, located at Buffalo, N. Y.

We will sell these as tanks or plates; or they can be made up to other size tanks.

19—Used (like new) horizontal welded standard 12,000 gallon gasoline storage tanks.

6—New heavy welded steel tanks, approx. 7' 6" in diameter x 13' 6" long, approx. 5/8" shell, ¾" bulged heads.

3—New vertical heavy welded steel tanks, approx. 4' 8" in diameter by 18' 8" high, bulged heads, approx. 1½" thickness throughout; with welded stands.

1—Never used horizontal welded steel tank, 11' in diameter by 30' long, 5/8" thickness, bulged heads.

Also a large quantity of new and used bolted type, welded and riveted steel tanks of all sizes and capacities.

3,400 ft.—14" O.D. 14 gauge used spiral welded steel pipe, in 40' lengths, grooved for Victaulic couplings.

A. GREENSPON PIPE CO., INC.
3615 Olive St., St. Louis 8, Mo.
FRanklin 0064

EQUIPMENT FOR SALE

TRUCKS: I. C. C. Authority — Oklahoma, Kansas, Illinois, Indiana: 1944 Dart Tandem Cummings Diesel Engine; 1947 C-70 Auto Car Truck; 1947 Montgomery Tandem Float; 1946 International K-7; two 1945 International K-7; 1940 International D-35; 1947 Ford Pickup; and 1942 Model L Allis-Chalmers Tractor with blade. 70 Tulsa winch. Trucks equipped with Montgomery bodies, winches, dual wheel pole trailers. Box C-519, The Oil and Gas Journal, Tulsa, Oklahoma.

WHEATLEY 6 x 6 SLUSH PUMP
Mission equipped. 4½" liners. V-belted to 25 hp. Waukesha engine.
SULLIVAN 22 H.D. CORE DRILL
Practically new. N-2 hydraulic swivelhead.
R. B. McElwaine, P.O. Box 127
Little Rock, Ark.

FOR SALE: Wilson Super Model Winch powered by 6 MZR Waukesha engine. Terms. Melton Supply Company, Seminole, Oklahoma.

FOR SALE: Three Ideco Winches, practically new. Suitable for 8000' well servicing. Terms. Melton Supply Company, Seminole, Oklahoma.

FOR SALE: Model F16 Franks, mounted on 42-V8; motor new in 1946. 300' N Rod suitable for shot hole work, testing for irrigation or water wells. In good workable condition. Rosencrantz - Bemis Equipment Co., Box 713, Great Bend, Kansas.

---

350 new 12-inch Victaulic couplings—bargain. 3—6' x 20' 1¼ inch shell welded storage tanks. The American Pipe & Supply Co., 3403 Brighton Blvd., Denver 5, Colorado.

FOR SALE: 2,200 feet 7 in. o.d. 20 lb. seamless casing. 30-ft. joints, $3.00 per foot. Harry Leamon, Yates Center, Kansas, Telephone 309.

FOR SALE—One Hopper rotary drilling rig, (portable) mounted on Sterling tandem truck, butane equipped, Franks type telescoping derrick, 72', 7¼" x 10" Gardner-Denver pump, 3,000' 3½" drill pipe. Equipment in fair condition. Contact Roy Powers, Box 560, or Phone 1144, Casper, Wyoming.

FOR SALE—40 Type R-1 Wico Igniters. Cheap. Cities Service Oil Co., Patridge, Bartlesville, Okla.

PRICED for quick sale. Three brand new Oil Well 5 x 8 heavy duty duplex slush pumps. Only $1,600 each. Cash. Box C-488, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR SALE: Failing 55 Rotary Truck Mounted Drill for 2000' production, irrigation, and ranch wells. Box C-498, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR SALE: 4—10' x 40' Horizontal Steel Gasoline Storage Tanks. $750 each. Cities Service Oil Co., Patridge, Bartlesville, Okla.

FRANKS double drum model 5000 spudder. Excellent condition. Mast, lines, tools, dog house, light plant, butane tank. Complete and ready to go. Gleason Drilling Co., Russell, Kansas.

DRILLING equipment, reconditioned ready for delivery, Failing, Franks, Eli Tulsa, Longyear, American, Sullivan, Fort Worth, Wichita, Keystone, National, Standards. Also steel derricks, cable tools, cable and good used casing, most sizes. Pressey & Son, Pueblo, Colo.

SULLIVAN Model 40 Drill Mounted 1945 International K 5 Truck, only 6000 miles on truck; 4½ by 6 Gardner Denver Pump, for oil or water well drilling; 400 gallon water tank, mounted on a 1½ ton 1945 Ford truck with new motor; 1941 Dodge pickup. Fisher Core Drlg. Co., 512 City Natl. Bldg., Wichita Falls, Texas. Phone 2-1805.

EQUIPMENT WANTED

NEED 10 to 20 Tubular Type Pumping Derricks with 1", 1½", 1¼", 2" and 3" or 4" pipe legs. Quote price and location. Box C-504, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED: One Model C.F.R. Octane Engine. Must be in excellent condition. Quote price, year manufactured, and location in first communication. Address all replies to: Great Lakes Refining Company, Blue Island, Illinois. Attention Mr. O. H. Longendorf, Purchasing Agent.

HELP WANTED

WE NEED FOR large Mid-Continent refinery: one Chief Chemist and one first-class electrician. Please submit application in own handwriting, giving background and experience. Box C-500, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED: OIL FIELD MECHANIC—experienced Diesel and Gas engines—heavy equipment. House furnished in yard at Hobbs, New Mexico. Apply by letter stating experience and references. Makin Drilling Company, Box 131, Hobbs, New Mexico.

PETROLEUM ENGINEER to supervise the completion of rotary drilled wells. Must be thoroughly experienced in Mid-Continent and Gulf Coastal areas. Liberal salary for capable man. Correspondence confidential. Box C-515, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED: Refinery Chemist—Recent Graduate Preferred—for Oklahoma Refinery. Send full particulars regarding experience, education, availability, and salary expected. C-510, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED: Process Engineer—With Several Years' Experience—for Oklahoma Refinery. Send full particulars on education, experience and salary expected. Box C-511, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED

Man familiar with oil well drilling and production practices, preferably with foreign experience, wanted for opening in New York office of international manufacturer of oil tools. Excellent opportunity for right man. Salary measured by ability. Write details of training-experience. Prefer under 35. Include recent photo. Permanent.

Address Box C-521
THE OIL AND GAS JOURNAL
Tulsa, Oklahoma

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1. DIRECTOR OF MARKETING. Require a top-grade administrator to direct sales, advertising and distribution of three oil refineries.
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NORTHWESTERN REFINING CO.
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ENGINEERING

During the next several months we will increase our Engineering Organization engaged in the design of Oil Refinery Plants and Power Plants. Location Cleveland, Ohio. The men we need should be qualified as draftsmen, designers, checkers or in higher engineering skills on design of piping, instrumentation, pressure vessels, structural steel, concrete, mechanical or electrical. For presenting your qualifications and prompt consideration, write to us for application form.

ARTHUR G. McKEE & CO.
2300 Chester Ave., Cleveland 1, Ohio

HELP WANTED

LAND MAN with executive ability for large operating company in Mid-Continent. Must be familiar with developments and land work in Texas. Replies will be confidential. Our qualified employes are aware of this ad. Box C-517, The Oil and Gas Journal, Tulsa, Oklahoma.

ENGINEER: Engineer for research in petroleum refinery equipment application. Experience with refinery or comparable process industry equipment essential. Considerable cost analysis involved. Location Chicago. Salary commensurate with training and experience. Standard Oil Company (Indiana), Room 200, Box 5910-A, Chicago 80, Illinois.

PETROLEUM ENGINEER—Independent production corporation with excellent holdings in Mid-Continent has opening for graduate Petroleum Engineer with about a year's field experience. Location Tulsa. Excellent opportunity. Write Box C-524, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED—Experienced cable tool drillers for big holes. Also drilling Supt. or tool pusher by large water well drilling concern operating in Minnesota. Give references and full data in first letter. Write Box C-522, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED: Graduate geologist familiar with Mid-Continent area for subsurface office detail and part time field work for independent company located in Oklahoma. In answering give training, experience, salary expected, and personal details. Box C-493, The Oil and Gas Journal, Tulsa, Oklahoma.

HELP WANTED

PETROLEUM ENGINEERS
Positions with excellent opportunity for two petroleum engineers with background or educational foundation necessary to undertake or assist with detailed geological and reservoir studies in southwest Texas. In replying give full details of education, experience, and salary expected. Replies confidential. Box C-494, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED: Graduate Petroleum Engineer, age 33-43, capable serving in dual capacity chief engineer and superintendent for extensive Kansas water flooding operations. Excellent opportunity for eventually becoming company executive, if qualified. Give full details of education, experience, and present salary in first letter. Enclose photograph if available. Replies will be held confidential. Box C-499, The Oil and Gas Journal, Tulsa, Oklahoma.

GRADUATE MECHANICAL ENGINEER to supervise maintenance of deep well rotary drilling rigs. Must be thoroughly experienced and capable. Good salary. Give past record. Your letters held confidential. Box C-516, The Oil and Gas Journal, Tulsa, Oklahoma.

CHEMICAL ENGINEER
Desired by major oil company to supervise research work in high pressure phase relations of multicomponent hydrocarbon systems. Desirable that applicant also contribute to work on drilling muds. Excellent opportunity to man with proper technical background and leadership ability. Give full details in reply to Box 2819, Dallas, Texas.

ILLINOIS REFINERY OFFERS EXCELLENT FUTURE TO MEN WHO CAN FILL THESE POSITIONS

Operations include 5000 b/d skimming and 2000 b/d cracking unit.

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IDEAL WORKING - CONDITIONS. ASSISTANCE IN SECURING HOUSING. PLEASE SEND PHOTOGRAPH AND RESUME OF EDUCATION AND EXPERIENCE TO

1000 SOUTH FREMONT AVENUE
ALHAMBRA CALIFORNIA

HELP WANTED

OIL Industry Employment Service, 319 Castle Bldg., Tulsa, Okla. Tom Robinson, Mgr., phone 4-5974. No fees to pay. Foreign service. Our client, a large producing company, has relatively new development in Persian Gulf area. 25 wells completed with 200 well program. Modern camp. Room, board, laundry, medical care furnished. Families of married men sent over after six months, at company expense. (10% separation allowance until family sent over). Our client needs: Production Engineers $600. Petroleum Engineers $550 to $650. Junior Petroleum Engineers $450 to $525. Mud Engineers $400 to $550. Assistant Reservoir Engineer $425 to $500. Meter Engineer $425. Regulator Maintenance Engineer $425. Rotary Drillers $480. All must be experienced. Paid vacation. Employees participate in company incentive plan. One year service equal to 1½ years seniority in U. S.

EXPERIENCED Gravity Party Chiefs/Supervisors for foreign work. Best working conditions. Excellent opportunity for advancement. Salary $7000.00 to $8000.00 per year. Family living allowance. Only men of exceptional ability need apply. Our personnel have been notified of this ad. Box C-484, The Oil and Gas Journal, Tulsa, Oklahoma.

SALES ENGINEERS
Experienced in selling refinery process and storage vessels and/or gas compressing equipment. Address Manager of Sales, The J. B. Beaird Company, Inc., Shreveport, Louisiana.

SITUATIONS WANTED

GRADUATE PETROLEUM ENGINEER Executive assistant with large producing company. Experienced in technical administrative work in production. Desires position with major or established independent. Age 33. Prefers East or Middle West but will consider anywhere. Box C-445, The Oil and Gas Journal, Tulsa, Oklahoma.

EXPERIENCED AS EXECUTIVE and in oil field operations. Graduate Mechanical Engineer with wide drilling and completion experience, also ability in leasing and negotiating drilling deals. Desire connection with independent oil operator, refiner, or party with material finances wishing to enter oil producing business. Prefer Tulsa Headquarters. References from recognized oil country executives. Box C-487, The Oil and Gas Journal, Tulsa, Oklahoma.

PRODUCTION SUPERINTENDENT: Graduate Petroleum Engineer, age 35. Capable full responsibility drilling, completion, production. Some geology. Desire connection with active producer in Mid-Continent or Rocky Mountains. Prefer Kansas. $7200 per year. Box C-490, The Oil and Gas Journal, Tulsa, Oklahoma.

LANDMAN-TITLEMAN: Thoroughly experienced, married—48—no dependants. Desires permanent employement, some scouting; will go anywhere. Now available. Box C-502, The Oil and Gas Journal, Tulsa, Oklahoma.

SITUATION Wanted: Experienced petroleum engineer, 31, family man, desires position in either Mid-Continent or West Coast, but will consider offer from any locality. Box C-401, The Oil and Gas Journal, Tulsa, Oklahoma.

SALES EXECUTIVE—18 years selling in Gulf Coast, 7 years as district manager, wide friendship with drilling, production, refining and chemical operators and suppliers, proven record. Desires connection this section with Houston as headquarters. Box C-506, The Oil and Gas Journal, Tulsa, Oklahoma.

GRADUATE PEROLEUM GEOLOGIST Over 20 years experience geology, lease and royalty trading, assembling drilling blocks, supervision of Rotary and Cable tools and Diamond Core drilling in Mid-Continent and Gulf Coast areas, desires full-time connection with substantial and aggressive Independent Oil Company or Drilling Contractor. Prefer location in West Texas or Rocky Mountain areas. Box C-518, The Oil and Gas Journal, Tulsa, Oklahoma.

TEXAS attorney, age 37, ex-army officer, experienced in all phases of land, title work, independent oil operations, office management, desires permanent position. Box C-520, The Oil and Gas Journal, Tulsa, Oklahoma.

SITUATIONS WANTED

YOUNG man experienced in Products Pipe Line and Terminal operations, desires position in Texas or Oklahoma. Will consider anywhere Southwest or Rocky Mountain. C-523, The Oil and Gas Journal, Tulsa, Oklahoma.

LEASE AND DRILLING BLOCKS

WANTED: Partner to join me in developing oil lease, depth 2700 feet, high gravity oil, surrounded by major companies. P.O. Box 546, Austin, Texas.

FOR SALE: 15 Berea Oil Wells, 15 Cow Run Oil Wells, 20 inside locations to drill. Mary Ann Oil & Gas Company, 342 N. Mulberry St., Bremen, Ohio.

FOR SALE: 12 barrel settled production on 120-acre lease. Depth 325 to 450 feet. Many more good looking locations yet to drill. W. P. Harley, Bowling Green, Kentucky.

WANTED
Will buy producing leases and producing royalties in Texas and Louisiana. R. J. Grant, 128 Main Plaza, Apartment 424, San Antonio 5, Texas.

SOUTHEASTERN NEW MEXICO
Leases, royalties and drilling blocks. Grant Keyes, 311 White Bldg., Roswell, New Mexico.

LEASES: Proven, semi-proven, and wildcat in Campbell, Crook, Laramie, Goshen, Albany, and Platee Counties, Wyoming. Large drilling blocks or 40-acre tracts, priced to sell. These areas are scheduled for considerable exploratory development by major companies. Box 382, Cheyenne, Wyoming.

FOR SALE: Oil and Gas Leases and Production in shallow territory. We do drilling and furnish equipment for wells; also look after shooting and equipping. W. P. Harley, Bowling Green, Kentucky.

CAN deliver five year paidup leases on 50,000 potential oil producing acres. Structure map and log of 3,329' well showing five distinct oil bearing strata available. Lund Engineering Co., 2838 Potrero Rd., Phoenix, Arizona.

BLACK Mesa Basin (N.E. Arizona). Acreage in drilling block on large structure and protective acreage on other structures, all recommended by Dorsey Hager, Consulting Geologist. Geo. C. Creager, 3623 N. Central, Phoenix, Arizona.

FOR SALE IN WHOLE OR IN PART
320 acres in fee, 90 acres mineral rights, close to high-grade oil pool Loving County, Texas; considerable equipment, and $100,000.00 Montana charter. Superb layout for big legitimate business. If desired retain interest and manage field work. Air mail or wire for particulars. E. L. STRATTON, owner and licensed Texas dealer, Pecos, Texas, vacationing in California until August 15. 1234 Euclid Avenue, Long Beach.

LEASES ROYALTIES
PRODUCING OR NONPRODUCING
Texas, New Mexico, Oklahoma, Louisiana and Illinois.
Inquiries Invited
B. D. BUCKLEY
60 Broadview Drive, Clayton (5), St. Louis, Missouri

PERSONAL

Application for Membership in the Diesel Engineers International Assn.
576 Newark Ave., Jersey City, N. J.
Name .....
Address .....
References .....

ROYALTIES

ANDREW J. BARRETT
The Philtower
Tulsa, Oklahoma

DEEDED ROYALTIES
San Juan Basin & Permian Basin. Write Harry S. Wright, Wright Bldg., Farmington, New Mexico.

WE will buy producing or non-producing oil royalties. Send particulars. Standard Security Company, 115 Broadway, New York 6.

FOR SALE

ALUMINUM PAINT—200—5 gallon cans, Exterior Spar Varnish vehicle. Highly polished, Aluminum Paste pigment in separate container. Distributors Liquidation. Regular price $24.75—take any part, $10 per 5 gallon can. Send check with order. The National, 606 Walnut, Kansas City, Missouri.

SERVICES

OIL: WORLD'S Greatest Oil Discovery—Electropositive system oil showing continuous trend. We connect one pool with another. Pay me when you get oil. R. H. Langhover, Geologist, 3025 N. Broadway, Wichita, Kansas.

Permian Basin

(Continued from page 141)

Worsham fee, Sec. 14, Blk. 6, H&GN Sur., 4 mi. SE Barstow, dry, TD 4,985 ft.

Schleicher County: L. W. Elliott 2 V. G. Tisdale, Sec. 16, Blk. A, HE&WT Sur., 3 mi. E Eldorado, dry, TD 3,008 ft.

Sutton County: Humble Oil & Refining Co. 2 Sol Mayer, Sec. 40, Blk. EF, GC&SF Sur., 18 mi. NW Sonora, dry, TD 9,827 ft., Wolfcamp 4,070 ft., Pennsylvanian 6,250 ft., Ellenburger 8 345 ft., Wilburn sand 9,750 ft., elev. 2,309 ft.

Southern Production Co. 1 Addie Garrett, Sec. 23, Blk. C. GH&SA Sur., 10½ mi. from S line and ¾ mi. from E line of county, dry, TD 4,578 ft., Ellenburger 3,990 ft., elev. 2,310 ft.

Southern Production Co. 1 Mrs. M. P. Rieck, Sec. 26, Blk. C, GH&SA Sur., 9 mi. from S line and ½ mi. from E line of county, dry, TD 4,143 ft., Palo Pinto 2,710 ft., Ellenburger 4,026 ft., elev. 2,210 ft., swabbed estimated 25-50 bbl. oil and some water a day from perforations at 2,752-66 ft.

SOUTHEASTERN NEW MEXICO

HOBBS.—In the Crossroads field of Lea County, Skelly Oil Co.'s southwest offset, the 1 U. D. Sawyer, NE NE 33-9s-36e, was drilling below 7,331 ft. in dolomite. It was reported running 125 ft. low on the Glorietta, topped at 5,590 ft., but 360 ft. high on the Clearfork which was placed at 5,850 ft., correlated with the discovery well. Elevation of Skelly's test is 4,043 ft. Magnolia Petroleum Co. 1 Yates-Federal, 3 miles southwest of the Crossroads discovery, was drilling in lime below 4,875 ft. It is said to be running about 68 ft. lower than the discovery. Correlation was apparently made on the San Andres, which was topped at 4,080 ft. in the Magnolia well.

In Chaves County, Richfield Oil Corp. 2 Comanche Unit, SE NE 24-11s-26e, was rigging up pump after being shut in for 6 days. When opened, however, the well flowed 75 bbl. of fluid, being 70 per cent water and the balance oil. Total depth is 6,330 ft. in dolomite, with perforations at 6,116-42 ft. in an unidentified section.

SOUTHEAST NEW MEXICO WILDCAT FAILURES

Chaves County: Richfield Oil Corp. 4-1 J. P. White, NW SW 31-9s-28e, dry, TD 2,838 ft., San Andres 1,670 ft., elev. 3,885 ft.

Eddy County: Ressler & Malco 1 E. Riggs-Federal, N½ SE SW 8-21s-24e, dry, TD 1,456 ft.

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August

Interstate Oil Compact Commission, summer meeting, New York, August 30-September 1.

American Chemical Society, 114th annual meeting, divided sessions, Washington, D. C., August 30-September 3; St. Louis, Mo., September 6-10; and Portland, Ore., September 13-17.

September

American Chemical Society, Division of Petroleum Chemistry, fall meeting, St. Louis, September 6-10.

The Instrument Society of America, third instrument conference and exhibit, Philadelphia Convention Hall, Philadelphia, September 13-17.

Pacific Coast Gas Association, annual convention, Hotel Casa del Rey, Santa Cruz, Calif., September 14-16.

American Petroleum Institute, Lubrication Committee, Hotel Traymore, Atlantic City, N. J., September 15-17.

National Petroleum Association, Hotel Traymore, Atlantic City, N. J., September 15-17.

Oklahoma Utilities Association, Gas Division, annual conference, Biltmore Hotel, Oklahoma City, September 17.

National Butane-Propane Association annual convention and trade exhibit, Congress Hotel, Chicago, Ill., September 20-22.

Independent Petroleum Association of America, annual meeting, Plaza Hotel, San Antonio, Tex., September 27-28.

October

American Society of Mechanical Engineers, petroleum division, Herring Hotel, Amarillo, Tex., October 3-6.

American Institute of Mining & Metallurgical Engineers, petroleum division, fall meeting, Adolphus Hotel, Dallas, October 4-6.

American Association of Petroleum Geologists, midyear meeting, technical session and 3-day field trip, William Penn Hotel, Pittsburgh, Pa., October 4-9.

American Gas Association, thirtieth annual convention, technical section, and exhibition of the Gas Appliance Manufacturers Association, Ambassador Hotel, Atlantic City, N. J., October 4-8.

California Natural Gasoline Association, twenty-fourth annual fall meeting, Ambassador Hotel, Los Angeles, Calif., October 1

National Lubricating Grease Institute, sixteenth annual convention, Edgewater Beach Hotel, Chicago, October 11-13.

American Association of Oilwell Drilling Contractors, eighth annual meeting, Rice Hotel, Houston, October 11-13.

Texas Mid-Continent Oil and Gas Association, twenty-ninth annual meeting, Fort Worth, October 14-15.

American Institute of Mining and Metallurgical Engineers, petroleum division, Elks Club, Los Angeles, Calif., October 14-15.

Independent Natural Gas Association of America, annual meeting, Mayo Hotel, Tulsa, October 26.

November

American Society of Mechanical Engineers, fuels division, Greenbrier Hotel, White Sulphur Springs, W. Va., November 3-4.

Society of Automotive Engineers, fuels and lubricants division, Mayo Hotel, Tulsa, November 4-5.

American Petroleum Institute, annual meeting, Stevens Hotel, Chicago, November 8-11.

January 1949

Society of Automotive Engineers, annual meeting, Book-Cadillac Hotel, Detroit, Mich., January 10-14.

March 1949

New England Gas Association, Hotel Statler, Boston, March 24-25.

Western Petroleum Refiners Association, thirty-seventh annual meeting, Plaza Hotel, San Antonio, Tex., March 28-30.

American Chemical Society, division of petroleum chemistry, spring meeting, San Francisco, March 27-April 1.

NOMADS

Houston Nomads, second Monday of each month, The Houston Club, Houston.

Los Angeles Nomads, second Wednesday each month, Jonathan Club.

New York Nomads: Golf party, Sept. 21, at Baltusrol Country Club, N. J.

Rocky Mountain Area

(Continued from page 139)

flowed 8 bbl. of oil from Madison through ¼-in. choke; Sundance 1,663 ft., Gypsum Springs 2,170 ft., Chugwater 2,210 ft., Dinwoody 2,665 ft., Phosphoria 2,682 ft., Tensleep 2,707 ft., Amsden 2,890 ft., basal Amsden 3,120 ft., Madison 3,135 ft., 7-in. casing at 3,415 ft., TD 3,450 ft., elev. 4,141 ft.

Johnson County, Taylor-Sussex: Continental 1 Coles, NW NW SE 17-42n-78w, flowed 241 bbl. of oil through ¼-in. choke; Shannon 4,390 ft., second Wall Creek 6,717 ft., Lakota 6,797 ft., TD 7,726 ft., elev. 4,987 ft.

COLORADO WILDCAT FAILURES

Archuleta County, Chromo: T. W. & H. Drlg. Co. 2 Fitzhugh, NE SE SW 33-33n-1e, dry, TD 1,210 ft., Dakota 1,206 ft., water.

Montezuma County, Montezuma Valley: J. G. Lane 1 Porter, NE SW NE 1-34n-17w, dry, TD 1,510 ft., Dakota 940 ft., Morrison 1,095 ft., red beds 1,498 ft.

MONTANA WILDCAT FAILURES

Blaine County, Wayne Creek: Nickerson et al 1 Miller, C NW NW 11-32n-24e, dry, TD 4,325 ft., Eagle 1,230 ft., Colorado 1,535 ft., elev. 2,700 ft.

Fregus County, Birch area: Rock Creek Bench Oil 2 Nessan, CNL NE NW 36-14n-16e, dry, TD 2,305 ft., Morrison 1,148 ft., Ellis 1,330 ft., Amsden 1,583 ft., Heath 1,763 ft.

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AMERICAN IRON

VALVES & SEATS

1. Our exclusive design first brings lip of insert in contact with top of seat . . .
2. Taper of insert is next brought into contact with taper of seat . . .
3. Taper of valve body next contacts taper of seat . . .
4. Bottom of Valve body then contacts top of webs in seat, but only after being cushioned by three previous contacts.

Designed right! Made right! That's why you get more from your pumps with American Iron Valves & Seats! You get extra service from our famous Compound 808 insert — the only insert kept in constant compression for longer life! In our three web seat design (originated by American Iron) you get the greatest fluid passage consistent with long-lasting performance. From start to finish . . . feature after feature . . . these valves and seats are designed right, made right — precision made — for long-lasting performance!

Available Thru Your Supply Store

AMERICAN IRON & MACHINE WORKS CO.

Oklahoma City, Oklahoma—Box 1177—Phone L. D. 518—District Office, Houston, Texas
Export Office: 420 Lexington Ave., New York City, N. Y.

REMEMBER THERE IS AN "AMERICAN IRON" SERVICE MAN IN EVERY ACTIVE FIELD